THE BIRDS OF AUSTRALIA.

THE

BIRDS

OF

AUSTRALIA

BY

GREGORY M. MATHEWS

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CONTENTS

AND

LIST OF PLATES.

PAGE
Order FALCONIFORMES 1

Genus CIRCUS 10
No. 291. Spotted Harrier, *Circus assimilis* 18
Plate 234 lettered *Circus rogersi*, to face 18

No. 292. Allied Harrier (Swamp-Hawk), *Circus approximans* 24
Plate 235 lettered *Circus gouldi*, to face 24

Genus LEUCOSPIZA 34
No. 293. Grey Goshawk, *Leucospiza cinerea* 36
Plate 236 lettered *Astur clarus*, to face 36

No. 294. White Goshawk, *Leucospiza novæhollandiæ* . . 43
Plate 237 lettered *Astur novæhollandiæ*, to face . . 43

Genus UROSPIZA 54
No. 295. Australian Goshawk, *Urospiza fasciata* . . . 56
Plate 238 lettered *Astur cruentus*, to face 56

Genus ACCIPITER 73
No. 296. Collared Sparrow-Hawk, *Accipiter cirrhocephalus* . 76
Plate 239 lettered *Accipiter cirrhocephalus*, to face . . 76

PAGE
Genus ERYTHROTRIORCHIS 84
No. 297. Red Goshawk, *Erythrotriorchis radiatus* . . . 87
Plate 240 lettered *Erythrotriorchis rufotibia*, to face . . 87

Genus UROAËTUS 94
No. 298. Wedge-tailed Eagle (Eagle-Hawk), *Uroaëtus audax* 95
Plate 241 lettered *Uroaëtus audax*, to face 95

Genus HIERAAËTUS 116
No. 299. Little Eagle, *Hieraaëtus pennatus* 118
Plate 242 lettered *Eutolmaëtus morphnoides*, to face . . 118

Genus BUTASTUR 127
White-eyed Buzzard, *Butastur teesa* 129

Genus CUNCUMA 131
No. 300. White-bellied Sea-Eagle, *Cuncuma leucogaster* . 133
Plate 243 lettered *Haliaëetus leucogaster*, to face . . . 133

Genus HALIASTUR 145
No. 301. White-headed Sea-Eagle (Red-backed Sea-Eagle), *Haliastur indus* 147
Plate 244 lettered *Haliastur leucosternus*, to face . . . 147

No. 302. Whistling-Eagle, *Haliastur sphenurus* . . . 160
Plate 245 lettered *Haliastur sphenurus*, to face . . . 160

Genus MILVUS 170
No. 303. Allied Kite, *Milvus migrans* 171
Plate 246 lettered *Milvus affinis*, to face 171

Genus LOPHOICTINIA 181
No. 304. Square-tailed Kite, *Lophoictinia isura* . . . 182
Plate 247 lettered *Lophoictinia isura*, to face . . . 182

CONTENTS.

PAGE

Genus GYPOICTINIA 187

No. 305. Black-breasted Buzzard, *Gypoictinia melanosterna* . 188
Plate 248 lettered *Gypoictinia decepta*, to face . . . 188

Genus ELANUS 197

No. 306. Black-shouldered Kite, *Elanus notatus* . . . 199
Plate 249 lettered *Elanus axillaris*, to face . . . 199

No. 307. Letter-winged Kite, *Elanus scriptus* . . . 208
Plate 250 lettered *Elanus scriptus*, to face 208

Genus LOPHASTUR 211

No. 308. Crested Hawk, *Lophastur subcristatus* . . . 216
Plate 251 lettered *Baza subcristata*, to face . . . 216

Genus FALCO 221

No. 309. Little Falcon, *Falco longipennis* 226
Plate 252 lettered *Falco longipennis*, to face . . . 226

No. 310. Grey Falcon, *Falco hypoleucus* 234
Plate 253 lettered *Falco hypoleucos*, to face . . . 234

Genus RHYNCHODON 240

No. 311. Black-cheeked Falcon, *Rhynchodon peregrinus* . 241
Plate 254 lettered *Rhynchodon submelanogenys*, to face . 241

Genus NOTOFALCO 252

No. 312. Black Falcon, *Notofalco subniger* 253
Plate 255 lettered *Notofalco subniger*, to face . . . 253

Genus IERACIDEA 259

No. 313. Brown Hawk, *Ieracidea berigora* 260
Plate 256 lettered *Ieracidea occidentalis*, to face . . . 260

Genus CERCHNEIS 281

No. 314. Nankeen Kestrel, *Cerchneis cenchroides* . . . 283
Plates 257 and 258 lettered *Cerchneis cenchroides* and *C. unicolor*, to face 283

PAGE

Genus PANDION 293

No. 315. White-headed Osprey (Fish-hawk), *Pandion haliætus* 295
Plate 259 lettered *Pandion cristatus*, to face . . . 295

Order STRIGIFORMES 303

Genus SPILOGLAUX 308

No. 316. Boobook Owl, *Spiloglaux novæseelandiæ* . . . 309
Plates 260, 261, 262 and 263 lettered *Spiloglaux mixta*; *S. halmaturina*; *S. boweri*; *S. clelandi*, to face . . . 309

Genus HIERACOGLAUX 334

No. 317. Winking Owl, *Hieracoglaux connivens* . . . 335
Plate 264 lettered *Hieracoglaux occidentalis*, to face . . 335

Genus RHABDOGLAUX 349

No. 318. Rufous Owl, *Rhabdoglaux rufa* 350
Plates 265 and 266 lettered *Rhabdoglaux rufa* and *Rhabdoglaux queenslandica*, to face 350

Genus BERNEYORNIS 355

No. 319. Powerful Owl, *Berneyornis strenuus* 356
Plate 267 lettered *Hieracoglaux strenua*, to face . . 356

Genus TYTO 360

No. 320. Delicate Owl, *Tyto alba* 365
Plate 268 lettered *Tyto delicatula*, to face 365

No. 321. Masked Owl, *Tyto novæhollandiæ* 373
Plates 269, 270, 271 and 272 lettered *Tyto novæhollandiæ*; *Tyto castanops*; *Tyto kimberli*; *Tyto melvillensis*, to face 373

No. 322. Grass-Owl, *Tyto longimembris* 398
Plate 273 lettered *Tyto walleri*, to face 398

CONTENTS.

PAGE
Genus MEGASTRIX 402
No. 323. Sooty Owl, *Megastrix tenebricosa* 404
Plate 274 lettered *Megastrix multipunctata*, to face . . 404

APPENDIX 411

INDEX 425

PREFACE.

THE completion of my Fifth Volume sees the world still at war but the ornithological world at peace, probably through the pre-occupation of ornithological students in the greater study. Certainly all the younger generation are otherwise engaged than attacking ornithological problems, commonly attacking a more intricate and complex problem. Nevertheless, let us hope that ere I am called upon to compose the Preface to another volume, the success of the younger ornithologists in the greater venture will have given them the well-earned leisure to continue peaceful inquiries among the avian fauna of their native land.

Consequently the present opportunity simply serves to reiterate my thanks for the continued assistance given me by my valued friends Captain S. A. White, Dr. W. Macgillivray, Messrs. T. Carter, H. L. White, J. W. Mellor and E. Ashby amongst others. I would mention that some have raised an objection to my criticisms of fellow Australian workers, judging them to be too severe. I would emphasize the fact that no personal belittling was intended, and that all my remarks should be read in the impersonal manner in which they are written. My only aim is to secure the truth and put the Australian Avifauna into such a state that my successors will be able to treat it with the fewest complications, and to this end criticism is sometimes necessary, though never a pleasing task.

GREGORY M. MATHEWS.

FOULIS COURT,
FAIR OAK, HANTS.
7th August, 1916.

ORDER—FALCONIFORMES.

I USE this name in preference to the one hitherto used by me, following Sharpe in the "Handlist," viz., Accipitriformes, as it is based on the oldest genus name in the group. As a matter of fact *Vultur* has page precedence, but the exact position of *Vultur* cannot be said to be settled. The genus does not occur in Australia, and as there proves to be serious disagreement as to the actual relationship of that genus I prefer to make use of the above term.

The Order covers birds of various sizes and forms, but all the members are easily recognised from those of any other group, save the following, by superficial characters, viz., the sharp-hooked bill with a cere at the base and the powerful feet provided with sharp-hooked claws.

These show the birds to be predaceous in nature, and for that reason they were long placed at the head of the Avian system.

Linné, in 1758, began his Aves with the Accipiters, his genera being *Vultur, Falco, Strix* and *Lanius.* The admission of the last-named genus seems strange at the present time, but it was of consistent inclusion.

The recognition of the Birds of Prey at the head of affairs lasted almost a hundred years without challenge, and it must be remembered that the famous *Catalogue of the Birds in the British Museum* began in 1873 with this group. Their position had, however, been ridiculed by the greatest student of the group, viz. Kaup, some thirty years previously. The exact relationship is not perfectly defined even at the present time, and I here give a short account of the vicissitudes of the constituents of the group. I, however, cannot hope to throw any light upon the phylogeny of the family, as they offer a most perfect example of convergence in evolution, or homoplasy, in almost every direction. Superficially they are so alike that one must grasp the slightest characters that are offered to define the genera. Genera-splitting has become universal, and the more study a worker has given this group the more genera has he recognised. This is also seen, as will hereafter be recorded, in the work of the osteologist, who has shown genera regarded superficially as closely related to be internally very different and who, moreover, has recognised that genera doubtfully so considered are very peculiarly defined when their osteology is consulted. Under such circumstances genus-splitting is the only course really available, and the names utilised in my *List of the Birds of Australia* will be generally maintained here.

For the purpose of these notes it would not be worth while going back beyond 1840, when G. R. Gray, in his *List of the Genera of Birds*, divided his Order Accipitres into two suborders: "*A. diurni*" and "*A. nocturni*." The latter will be discussed later.

The "*A. diurni*" was divided into two families, Vulturidæ and Falconidæ, the former of which had no Australian representatives. The latter was divided into seven subfamilies, viz., Polyborinæ, Buteoninæ, Aquilinæ, Falconinæ, Milvinæ, Accipitrinæ and Circinæ.

Numerous genera were recognised, many of which have since been further subdivided, though some of the ones there admitted have been recently rejected, probably on account of lack of deep study of this family.

The monographic study made of this group by Kaup shortly afterwards was not accepted in its entirety mainly on account of the views held by that author. Kaup published a long account in 1844, and adding to it in the *Isis* 1845-8, then published in "Jardine's Contributions to Ornithology 1849-51" a *résumé*, with additions and corrections. I will deal with the last-named article only.

J. J. Kaup was probably the most philosophical ornithologist of his time and he became captivated by the "Macleay quinary system." This apparently futile system captured the brains of some of the cleverest heads of Europe and Kaup fell a victim to it. The idea is so dead now that it is quite probable that many of my readers have never heard of it, and as the founder has a sentimental interest of the greatest value to Australians, I would here make a few notes regarding it.

A very recently published comment of a practically contemporaneous worker may be here cited. In the *Journ. Proc. Royal Soc. N. S. Wales*, Vol. XLVIII., pp. 141-151, 1914, Hedley has reprinted the "Australian Journal of Dr. W. Stimpson." On p. 146 is reprinted the note made by that voyageur in Sydney on the 29th Dec., 1853, as follows: "I spent this day in the city examining Wilcox's collection. That gentleman gave me some curious accounts of some naturalists whom I had long known by reputation, but did not dream of finding *in propria persona* in this part of the world. He informed me that Macleay, the originator of the 'circular theory' of classification in natural history, was now residing at this place and that Swainson, who carried out that theory so fully in zoology (see his works in Lardner's Cyclopedia) was now wandering in these parts, poor and neglected, though still hopelessly moping over zoological subjects, though old and past

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active and useful labor in the field of science. As I listened to Wilcox's account, the conceit entered my mind that these two men were banished, as it were, from the scientific world of the Atlantic shores, for the great crime of burdening zoology with the false though much labored theory which has thrown so much confusion into the subject of its classification and philosophical study."

It is probable a different view may now be taken of Macleay's theory, inasmuch as it endowed Swainson with the desire to test its working and consequently, as in many other cases, a wrong theory is better than none at all. It is more than probable that the theory and its great advocacy by many master minds was responsible for more accurate work by its opponents and this would entail greater research and consequently greater benefits would accrue.

The theory was an intricate one, which endeavoured to see analogies to a quinary cycle of life in every object, and workers such as Swainson and Kaup set out to prove this. The necessity of seeing these analogies demanded close attention to the objects under observation and this close application was necessarily conducive of new results. That these observations were wrongly construed is at present a matter of small import: the fact that they were put on record constitutes the great value of the work. Kaup, then, being enamoured of this theory, took up the Birds of Prey as a suitable object of study, and his first result was their dethronement. He then criticised all the birds available to recognise and fix his analogies, as demanded by his theory, and discovered many new facts. His diagnoses in the paper under notice show how carefully he examined the birds. His writings show him to have been careful and thoughtful and he was one of the first to recognise that monography was the only real means of advancement. He came to England to study the birds in the British Museum, and then observed that had he the whole of the specimens of one family from every Museum in his own place he could do better work by studying that one family thoroughly than in any other way. Scores of years afterward his dictum is absolutely true. Yet he laboured under the false theory so much despised by Stimpson. It seems, here, that the theory was productive of good, though itself inherently bad.

Kaup's conclusions as shown in the Contributions can be summarized thus. It was the object of the theory to show that all nature was divisible into series of fives, and the first was closely related to the fifth so that a circle was completed. Consequently he divided the family Falconidæ into five subfamilies, commencing with the Falconinæ, followed by Milvinæ, then Accipitrinæ, then Aquilinæ, and lastly Buteoninæ, which was considered as approaching, in many respects, the Falconinæ again. The difficulty of being tied down to such a system is obvious: each form *must* fall into these five, and as each subfamily again was only allowed five genera and each genus five subgenera, the limits of the Falconidæ was one hundred and twenty-five subgenera. I have not studied the system to see if each subgenus was limited to five species, but if so the species were also absolutely limited. To this drawback was contrasted the fact that many generic and subgeneric forms to fit into the circle had not been discovered, so that if a genus or subgenus were becoming overcrowded, the species could be drafted into another circle. Such an ingenious arrangement seems quite unnatural and met with violent opposition which soon killed it, yet the workers who were attracted by it were the most accurate and persevering of their day.

Kaup then divided the subfamily Falconinæ into the genera *Hierax*, *Tinnunculus*, *Harpagus*, *Falco* and *Ieracidea*. The first, third, and fifth proved indivisible, but the second and fourth provided a full quinary complement of subgenera, viz., *Polihierax*, *Erythropus*, *Poecilornis*, *Tichornis* and *Tinnunculus* in the first case, and *Aesalon*, *Hypotriorchis*, *Gennaia*, *Falco* and *Hierofalco* in the other.

In a similar manner the other subfamilies and genera were split up. The majority of these divisions were first proposed by Kaup, and if Kaup did nothing else he made other workers look at the birds to see whether the differences he recorded existed or not. That is the one advantage of splitting, and it must be as applicable to genera as species. It is a remarkable fact that almost every worker who devotes himself to a group becomes a genus-splitter, and only superficial observers continue genus-lumping. We have not yet studied any group so fully that we can dogmatise what is a genus or not: a genus must be a natural association of species; if the association of species be proved unnatural on any grounds, then the best purpose will be served by disintegration. Thus, *Falco* was subdivided by Kaup, as noted above, and it will be observed that he admitted *Tinnunculus* (=*Cerchneis* of this time) and *Erythropus*. Genus-lumpers would include these latter again in *Falco*, urging that the last named is a connecting link. I will discuss this item more fully later on, but I would here state that *Cerchneis* seems absolutely differentiated, and, if included, no line can be drawn with accuracy. The usage of a different name is a slight matter if better definition is thereby secured. If it be convenient to handle hundreds of trinomials, why should convenience stick at a few different generic names? Kaup's subdivisions have been more or less admitted since his day and they have been transferred backwards and forwards in endeavours to provide natural systems.

FALCONIFORMES.

G. R. Gray, the foremost British ornithologist of the last century, in his *Handlist of Birds*, Part I., 1869, divided the Accipitres into four Families, viz., Gypaëtidæ, Vulturidæ, Falconidæ and Serpentariidæ. The Falconidæ only concern us, and this was separated into the same seven subfamilies he had admitted in 1840. Thus, as regards the larger divisions, Gray had not been influenced by Kaup's work and arguments, for the latter explicitly states that he discussed his ideas with Gray, and though agreeing in details they had agreed to amicably differ on the larger questions. Soon afterwards Sharpe monographed these birds in the first volume of the *Catalogue of Birds.* His ideas were somewhat immature, as he had no previous interest in the group as an asset. He admitted two suborders, Falcones and Pandiones: the former was divided into two families, Vulturidæ and Falconidæ, the latter again into four subfamilies, Polyborinæ, Buteoninæ, Aquilinæ and Falconinæ.

The chief result of this Catalogue was its criticism by J. H. Gurney during a period of almost ten years. This worker had made a specialistic study of the group and was admittedly competent to provide a review of Sharpe's work. The articles in the *Ibis* from 1875 to 1882 dealing with the species, one by one, show the capability of the writer. This survey was completed by a List, as Gurney arranged the Order. This List is a remarkable example of the splitting of the specialist, and I here reproduce Gurney's system down to subgenera, as it is certainly the most complete yet provided from a study of skins.

Family Serpentariidæ. Genus Serpentarius.
Family Cathartidæ. Genera Sarcorhamphus, Gyparchus, Pseudogryphus, Rhinogryphus and Catharista.
Family Vulturidæ. Genera Vultur (subgenus Lophogyps), Otogyps, Gyps, Pseudogyps and Neophron.
Family Falconidæ with thirteen subfamilies.
I. Subfamily Gypaëtinæ. Genus Gypaëtus.
II. Subfamily Gypohieracinæ. Genus Gypohierax.
III. Subfamily Polyborinæ. Genera Polyborus, Senex, Phalcobænus, Milvago, Daptrius and Ibycter.
IV. Subfamily Circaëtinæ. Genera Herpetotheres, Circaëtus, Spilornis, Dryotriorchis, Eutriorchis and Helotarsus.
V. Subfamily Gymnogenynæ. Genus Polyboroides.
VI. Subfamily Circinæ. Genus Circus.
VII. Subfamily Accipitrinæ. Genera Micrastur, Geranospizias, Urotriorchis, Melierax, Asturinula, Astur, Lophospizias, Nisoides, Scelospizias, Erythrospizias, Tachyspizias, Leucospizias,

Urospizias, Accipiter (subgenus Cooperastur), Erythrotriorchis and Megatriorchis.

VIII. Subfamily Thrasaëtinæ. Genera Morphnus, Harpyopsis and Thrasaëtus.

IX. Subfamily Aquilinæ. Genera Spizaëtus, Limnaëtus, Lophotriorchis, Lophoaëtus, Neopus, Spiziastur, Nisaëtus, Aquila and Uroaëtus.

X. Subfamily Haliaëtinæ. Genera Thalassaëtus, Haliaëtus and Polioaëtus.

XI. Subfamily Buteoninæ. Genera Archibuteo, Buteo, Antenor, Onychotes, Buteola, Rupornis, Butastur, Asturina, Geranoaëtus, Leucopternis, Urubitinga, Harpyhaliaëtus, Heterospizias, Buteogallus and Busarellus.

XII. Subfamily Milvinæ. Genera Haliastur, Milvus (subgenus Lophoictinia), Gypoictinia, Elanoides, Nauclerus, Gampsonyx, Elanus, Ictinia, Rostrhamus, Machærirhamphus, Pernis, Henicopernis, Regerhinus, Leptodon and Baza.

XIII. Subfamily Falconinæ. Genera Harpagus, Microhierax, Poliohierax, Spiziapteryx, Dissodectes, Harpa, Hieracidea, Tinnunculus (subgenus Erythropus), Hypotriorchis, Aesalon, Chicquera and Falco (with subgenera Gennaia and Hierofalco).

Family Pandionidæ. Genus Pandion.

Since Gurney's time no one has paid much attention to this group as a whole, and consequently we have not the advantage of any accurate criticism of the above. It is obvious that a worker, such as myself, dealing with a few species from a circumscribed locality only, cannot make a detailed reconsideration of the preceding, and can only deal with a few points. Moreover, such criticism is of a temporary character and may be modified at any time by the accession of more material and further study.

Sharpe, in the *Handlist Gen. Sp. Birds*, Vol. I., 1899, somewhat improved his 1874 classification, although practically rejecting Gurney's scheme. Sharpe's emendation shows the recognition of three suborders, Serpentarii, Accipitres and Pandiones. The second named has two families, Vulturidæ and Falconidæ; the latter five subfamilies, viz., Polyborinæ, Accipitrinæ, Buteoninæ, Gypætinæ and Aquilinæ.

I would now deal with a classification of the Falconiformes founded on osteological study which appeared in the *Proc. Zool. Soc.* (Lond.) 1902, pp. 314-316. There Pycraft, after studying the group for some time, accepted Suschkin's classification. The latter had made a specialistic study of the osteology of the group in the same manner as Gurney had studied the skins. The result is the same, inasmuch as Suschkin proves to be a splitter scarcely inferior to Gurney. Pycraft wrote: "My study of this group has convinced me of the soundness of Dr. Suschkin's conclusions. . . . What follows is practically an embodiment of Dr. Suschkin's views *in toto*: where I have had to interpret him, that is to say where I have endeavoured to express what I believe to have been his views, I hope I have done him justice."

I here transfer this arrangement as written by Pycraft, as it expresses the views of the osteologist at the present time upon this admittedly difficult group judged from skins only.

"The suborder, then, of the Accipitres is divided into two Families, the Falconidæ and the Buteonidæ.

"The family Falconidæ is to be divided into two subfamilies: (1) the *Falconinæ*, (2) the *Polyborinæ*. The former includes the genera *Harpa*, *Herpetotheres*, *Micrastur*, *Microhierax*, *Poliohierax*, *Tinnunculus*, *Hypotriorchis*, *Hierofalco* and *Falco*. The subfamily Polyborinæ embraces the genera *Milvago*, *Senex*, *Phalcobœnus* and *Polyborus*. The family Buteonidæ is divided into some eleven or twelve subfamilies, though about this I am not quite clear, as Suschkin has not definitely expressed himself on this point. But he would apparently recognise the following: *Elaninæ*, *Perninæ*, *Milvinæ*, *Aquilinæ*, *Thrasaëtinæ*, *Vulturinæ*, *Circaëtinæ*, *Polyborinæ*, *Circinæ*, *Urubitinginæ*, *Buteoninæ* and *Accipitrinæ*.

"In the Elaninæ are included *Elanus* and *Machærhamphus*. In the Perninæ, *Pernis*, *Baza*, *Elanoides*, *Leptodon* and *Pandion*. But from views he expressed in conversation, he would, I suspect, probably make a separate subfamily for *Pandion*—Pandioninæ; and most, I think, will feel this advisable.

"The Milvinæ include *Milvus*, *Haliastur* and *Haliaëtus*, with, apparently, *Ictinia*, *Rostrhamus* and *Polioaëtus*. *Haliaëtus*, there can be little doubt, has nothing to do with the Eagles. *Polioaëtus* Suschkin shows to be undeniably distinct from *Pandion*. The plantar tendons, as he proved by a dissection made in this Museum, are of the Accipitrine type: the skeleton in no way resembles that of *Pandion*: on the contrary, the pelvis and breastbone, so characteristic in *Pandion*, bear a quite extraordinary resemblance to those of *Haliaëtus*. The outer toe is not more reversible than in ordinary Accipitres. *Haliaëtus*, *Thalassaëtus*, and *Polioaëtus* might well be made to form a separate subfamily, *Haliaëtinæ*. The subfamily Aquilinæ includes *Aquila*, *Uroaëtus*, *Spizaëtus*, *Nisaëtus* and *Lophoaëtus*. The Thrasætinæ contain *Morphnus* and *Thrasaëtus*. This brings us to the *Vulturinæ*. By most, this subfamily is regarded as of more importance than is allowed in the present scheme, Gadow and Sharpe, for example, according it the rank of a family. That the Vultures have undergone a considerable amount of specialization there can be no doubt: but it seems equally certain that they are not far removed from the *Circaëtinæ*. Suschkin recognises evidence of two distinct branches in this family—*Gypohierax* standing at the base of one, and leading to *Neophron* and *Gyps*: *Gypaëtus* at the base of the other, and leading to *Vultur* and *Otogyps*. The Circaëtinæ includes *Circaëtus, Geranospizias, Helotarsus* and *Spilornis*. Closely allied and intermediate between it and the next subfamily—the Circinæ—comes the highly specialised Polyborinæ. It seems to me that this subfamily might perhaps as well be included in the Circinæ, with which, as Dr. Suschkin shows, it has many characters in common, and in this I can confirm him.

"The Circinæ embrace *Circus, Geranospizias, Urotriorchis* and *Strigiceps*. The Urubitinginæ I have added on my own responsibility. Dr. Suschkin speaks of them as isolated forms related to the *Circaëtinæ*.

"The Buteoninæ include *Buteo, Archibuteo, Tachytriorchis, Geranoaëtus, Rupornis, Leucopternis,* and apparently *Busarellus, Butastur, Antenor* and *Asturinula*. In the Accipitrinæ Dr. Suschkin includes *Accipiter, Astur, Melierax, Urospizias, Lophospizias, Scelospizias* and *Nisoides*."

Pycraft added: "Though we cannot regard this scheme as final, yet, it must be admitted, it is one which is in many respects an advance upon previous arrangements of this most difficult of groups. In its construction an attempt has been made to follow the lines of phylogenetic descent, the only satisfactory basis of classification, yet a peculiarly difficult one in all questions of avain descent, owing to the lack of annectant fossil forms."

An obvious mistake in this scheme is the admission of the subfamily Polyborinæ twice, once under Falconidæ and then under Buteonidæ. A gratifying point is the recognition from osteological characters of the genera *Tinnunculus, Hypotriorchis, Hierofalco* and *Falco*. That certain Australian forms are not generically recognised, as *Ieracidea, Hieraaëtus*, etc., may be put down to lack of material and not to absolute rejection. It must be admitted that special study, either given to external or internal characters, has led to the same result, a great splitting, which proves the difficulty of this group.

The few forms occurring in Australia prohibit the investigation of the entire group in this place, but the preceding notes should be of value as showing the location of the Australian species.

I would point out that in this group, once more, a peculiar endemism is observed, but here it is seen to be obviously due to specialization and all the forms are highly developed, and we find none that suggests a southern origin in any way, but all are readily placed as derivatives of northern stock. This would agree with the phylogeny of the group.

Moreover, study of this group leads to the conclusion that there has been two distinct migrations from the north, and I will deal more fully with the particular instance of the two species of *Haliastur*. Thus, while we have specialised forms such as *Circus assimilis*, *Leucospiza*, *Erythrotriorchis*, *Uroaëtus*, *Haliastur sphenurus*, *Lophoictinia*, *Gypoictinia*, *Notofalco*, and *Ieracidea*, we have living alongside species apparently strictly referable to *Circus*, *Accipiter*, *Hieraaëtus*, *Butastur*, *Cuncuma*, *Haliastur indus*, *Milvus*, *Elanus*, *Baza*, *Falco*, *Rhynchodon*, *Cerchneis*, and *Pandion*. These latter are all closely related to Indian, European or otherwise extra-limital forms with a wide distribution, and would appear to have arrived in Australia at a more recent date than the former. It might be argued that these might have arrived simultaneously, but being older forms have not been subject to variation to the extent of the species showing generic differentiation allied to endemism. I think this view is contradicted by the two species of *Haliastur*, and that this contradiction is confirmed by the *Notofalco* and *Ieracidea*. The fact that the New Zealand Hawk is also considered separable as *Nesierax*, and the nearest relative of this genus is at present supposed to be *Ieracidea*, I would cite as evidence of the descent of both from a northern ancestor. After much consideration I, however, conclude that a detailed examination of the osteology of all the species is necessary before conclusive speculation can be profitably indulged in.

Genus—CIRCUS.

Circus Daudin, Hist. Nat. Buffon, ed. Didot, Quadr. Vol. XIV., p. 221, 1802 (ex Lacepède Tabl. Ois., p. 4, 1799 ; nom. nud.)	Type *C. æruginosus.*
Pygargus Koch, Syst. Baier. Zool., pp. xxxii., 127, 1816	Type *C. pygargus.*
Strigiceps Bonaparte, Comp. List Birds of Europe and N. America, p. 5, 1838 (ex Giorn. Arcad. Roma, Vol. XLIX., p. 36, 1831 : nom. nud.)	Type *C. pygargus.*
Glaucopterix Kaup, Class. Saugeth. u Vögel, p. 113, 1844..	Type *C. pygargus.*
Also spelt— *Glaucopteryx* Kaup, Mus. Senckenb., Vol. III., p. 258, 1845.	
Spizacircus Kaup, Mus. Senckenb., Vol. III., p. 258, 1845..	Type *C. macropterus.*
Also spelt— *Spiziacircus* Kaup, Archiv. fur Naturg., 1850, p. 32.	
Spilocircus Kaup, Isis 1847, p. 89	Type *C. assimilis.*
Pterocircus Kaup, Archiv. für Naturg., 1850, p. 32	Type *C. pygargus.*

Medium-sized Aquiline birds with short bills, long wings, long tail and long legs with rather small feet. The word "Aquiline" is here used in the sense of the classification of Suschkin, who separates the "Aquiline" birds from the Falconine.

The bill is small, sharply hooked, with a cere at the base in which the nostrils are placed ; the under edges of the upper mandible are sinuated but not toothed ; the bill is deep at the base and rather broad ; the nostrils are oval apertures placed near the culmen ridge, with no bony obstruction apparent internally : they are hidden by bristles developed on the lores ; the under mandible is shallow, not hooked.

The wings are long, with the first primary short, the third or fourth longest, the first four quills emarginate on both webs. The tail is composed of twelve feathers more than half the length of the wing.

The legs are long, the toes rather short ; the tibia is also long but covered with feathers which extend on to fore portion of the tarsus but not on the back.

CIRCUS.

The tarsus is more than twice the length of the culmen and less than one-third the length of the tail. The tarsal covering consists of transverse scutes in front and small reticulations on the sides, but larger ones with the appearance of irregular scutes on the back, more pronounced towards the toes: in immature birds the nature of the tarsal covering is obvious, but in the adult the tendency is to fusion; this tendency becomes very pronounced in very old examples and especially in those of *Circus assimilis*, where at the first glance the fusion both as regards the front and back often appears complete.

Exactly the same thing may be seen in species of *Astur* (sensu lato) and *Accipiter*, so that it is most necessary to carefully examine immature birds to judge this feature.

The wing formulæ of the species varies to a slight extent, and as a genus *Strigiceps* has been recognised as valid at times, and apparently is now by osteological workers, I would note the differences observed.

In *Circus æruginosus* the third and fourth primaries are subequal and longest, the second and fifth little shorter and practically subequal, the first equal to the sixth. Such an arrangement makes a rather pointed wing, though the first primary is very short.

In *Circus pygargus* the third primary is longest, the second and fourth little shorter and subequal, the first between the fifth and sixth.

In *Circus assimilis* the fourth primary is longest, the third and fifth little shorter and subequal and the second less than the third, but much longer than the first, which is about equal to the sixth.

None of the comparative proportions seem to differ to any extent that can be appreciated, and as the females exceed the males, measurements of the males of a larger bird agree very closely with those of a female of a smaller bird.

In the nestlings the toes are thin and long, but as the bird grows the tarsus develops in length while the toes do not correspondingly increase; as a result, the legs are long and the toes are rather short, so that the middle toe is only about half the length of the tarsus.

In the Accipitrine group, strictly considered, the legs, wings and bill seem very similar, and superficially these would appear the nearest relations of *Circus*.

Suschkin and Pycraft, however, interpose the Buteoninæ between these groups; this does not seem perfectly natural, so that a reconsideration is suggested and especially the relationship of *Astur*, *Accipiter* and *Circus*.

As the authority for the genus-name, Lacepède has been commonly given with a reference to the *Tableau Oiseaux*. I have already signified my intention regarding these names by writing in the *List of the Birds of Australia* 1913, p. 101, " ? nom. nudum."

I here fully reject the names given to the divisions by Lacepède and quote them as of Daudin. As the books concerned are rare, I give quotations concerning the names so that my readers can appreciate my conclusions at once.

Lacepède's *Tableau* consists of divisions down to genera *with no species indicated*: that is, the new generic names proposed absolutely depend upon the diagnoses given. In the cases under consideration we have the following:

" Seconde Division.	Trois doigts devant: un doigt, ou point de doigt derrière.
Première Sous-Division.	Ongles forts et très-crochus.
Septième Ordre.	Bec Crochu.
Quatorzième Genre.	Autour. *Astur.*

Le bec crochu à l'extremité; la tête plate en dessus, et garnie de plumes; la base du bec recouverte d'une cire; les ailes courtes; la première penne de l'aile, très-courte; le tarse long.

Quinzième Genre. Epervier. *Nisus.*

Le bec courbé dès la base; la tête plate en dessus, et garnie de plumes; la base du bec recouverte d'une cire; les ailes courtes; la première penne de l'aile, très-courte; le tarse long.

Seizième Genre. Base. *Buteo.*

Le bec courbé dès la base; la tête plate en dessus, et garnie de plumes; la base du bec recouverte d'une cire; les ailes très-longues; la première penne de l'aile, très-courte; le tarse gros et court.

Dix-Septième Genre. Busard. *Circus.*

Le bec courbé dès la base; la tête plate en dessus, et garnie de plumes; la base du bec recouverte d'une cire; les iles très-longues; la première penne de l'aile, très-courte: le tarse long et grêle.

Dix-Huitième Genre. Milan. *Milvus.*

Le bec courbé dès la base; la tête plate en dessus, et garnie de plumes; la base du bec recouverte d'une cire; les ailes très longues; la première penne de l'aile, très-courte: le tarse court et foible."

I think it will be obvious that the preceding divisions cannot be determined from these definitions. Thus the only differences in the diagnoses of *Astur* and *Nisus* are seen in the remarks: "Le bec crochu à l'extremité" and "Le bec courbé dès la base" respectively, which are not sufficient to distinguish these two genera.

Again, *Circus* differs from these two in the following particulars only: "les ailes très-longues" against "les ailes courtes" and "le tarse long et grêle" instead of "le tarse long" only.

Further, *Milvus* differs from *Buteo* only in the character "le tarse court et foible" against "le tarse gros et court."

In the XIVth Volume of *Quadrupeds in Hist. Nat. Buffon*, ed. Didot, published in 1802, Daudin reproduced Lacepède's diagnoses without alteration, but added to them the species figured and described in the Buffon bird portion, giving Latin names to these accounts and utilising the Lacepèdean genera. From this place, therefore, must the above-mentioned genera be dated.

Thus to *Astur* Daudin added, p. 219: *Astur palumbarius*, *Astur badius* and *Astur cayanensis.*

To *Nisus*, Daudin (p. 220) allotted *Nisus vulgaris*, *Nisus columbarius* and *Nisus magnirostris.*

To *Buteo*, Daudin (p. 220) accorded *Buteo vulgaris*, *Buteo cinereus* and *Buteo apivorus.*

To *Circus*, Daudin (p. 221) added *Circus æruginosus*, *Circus cyaneus*, *Circus pygargus* and *Circus rufus.*

As *Milvus*, Daudin (p. 221) recognised *Milvus vulgaris*, *Milvus furcatus* and *Milvus ater.*

The types of *Nisus*, *Buteo* and *Milvus* are settled by tautonymy, and Vigors in 1824 and Lesson in 1828 designated the types of *Astur* and *Circus*, and these names continue in their conventional significance, the only alteration being their reference to Daudin instead of Lacepède.

The genus *Circus* as here accepted has been subdivided, but it is difficult from a superficial examination of the external features to determine these subdivisions. Bonaparte, in the *Giorn. Arcad. Roma*, Vol. XLIX., p. 36, 1831, first indicated a subdivision *Strigiceps*, but no definition whatever was given, the name occurring only as a *nomen nudum.* In 1838, however, in his *Comp. List of Birds of Europe and North America*, p. 5, he included under this name *Circus pygargus* Linné, known at that time by Montagu's later name of *C. cinerascens.*

Kaup, in his investigations into the Quinary system, split *Circus* up into five subgenera, viz., *Strigiceps*, *Glaucopterix*, *Spilocircus*, *Spizacircus* and *Circus.*

In *Jardine's Contr. Orn.* 1849, p. 70, he explained one case as follows: "If I made *Circus cinerascens* and *pallidus* into a subgenus, I did it not only on account of the short secondaries, the long primaries, and the small number of emarginated quills. . . . That both species get only in their third year the plumage of the old ones, and that the plumage of the middle age is so different from both, I consider as yet but as a secondary character, which, however, may contribute to make us consider this little group to be perfectly characterised." The details in support of his subdivisions show how closely Kaup examined his birds, and it may be that his conclusions will yet be proved to be correct.

Sharpe, in the *Catalogue of the Birds in the British Museum*, Vol. I., 1874, lumped Kaup's subdivisions without explanation and gave diagnostic remarks for the recognition of *Circus* as follows:

"Outer toe only connected to middle toe by interdigital membrane. Tibia and tarsus to all intents equal in length, the difference between them not so great as length of hind claw. Accipitrinæ.

"Sides of face feathered, the lores always furnished with bristles. Hinder aspect of tarsus reticulate. Nostrils oval, with no bony excrescence. *Circus*.

"Hinder aspect of tarsus scaled. Nostrils oval with no bony tubercle. *Astur*."

These definitions are not as good as Kaup's, and in the case of *Astur* incorrect, as many species allotted by Sharpe to that genus do not show the essential (!) character: "Hinder aspect of tarsus scaled."

Gurney's comments on this (*Ibis* 1875, p. 221) read: "In treating of the Harriers, Mr. Sharpe comprises all the known species of this group under the genus *Circus*, which is probably a judicious course, as, although that genus seems to be naturally divisible into distinct sections (probably four in number), it would be difficult to define these satisfactorily without a fuller acquaintance than we at present possess, with such variations of coloration as are incident to the sexes and successive ages of each species."

In the present place, following Sharpe's "Handlist," *Circus* appears at the beginning of the Order, and as this classification is based upon evolutionary principles, it would naturally be concluded that *Circus* was the most primitive member of the Order and nearest relative of the Pelicans just preceding it. As a matter of fact, this is not so, as when Sharpe rearranged the Orders, etc., in the "Handlist," he omitted to rearrange the genera and species, and *Circus* is really a specialised form, and in the system provided by Pycraft ex Suschkin already detailed, and which purposes "to follow the lines of phylogenetic descent," it appears near the end.

The Accipitrinæ are there the highest, and are preceded by the Buteoninæ and then the Circinæ. No data for this succession is given by Pycraft and I have been unable to follow Pycraft's treatment of this group. I suggest that the Circinæ are more closely allied to the Accipitrinæ than they are to the Buteoninæ, and the latter are nearer the Circinæ than they are the Accipitrinæ.

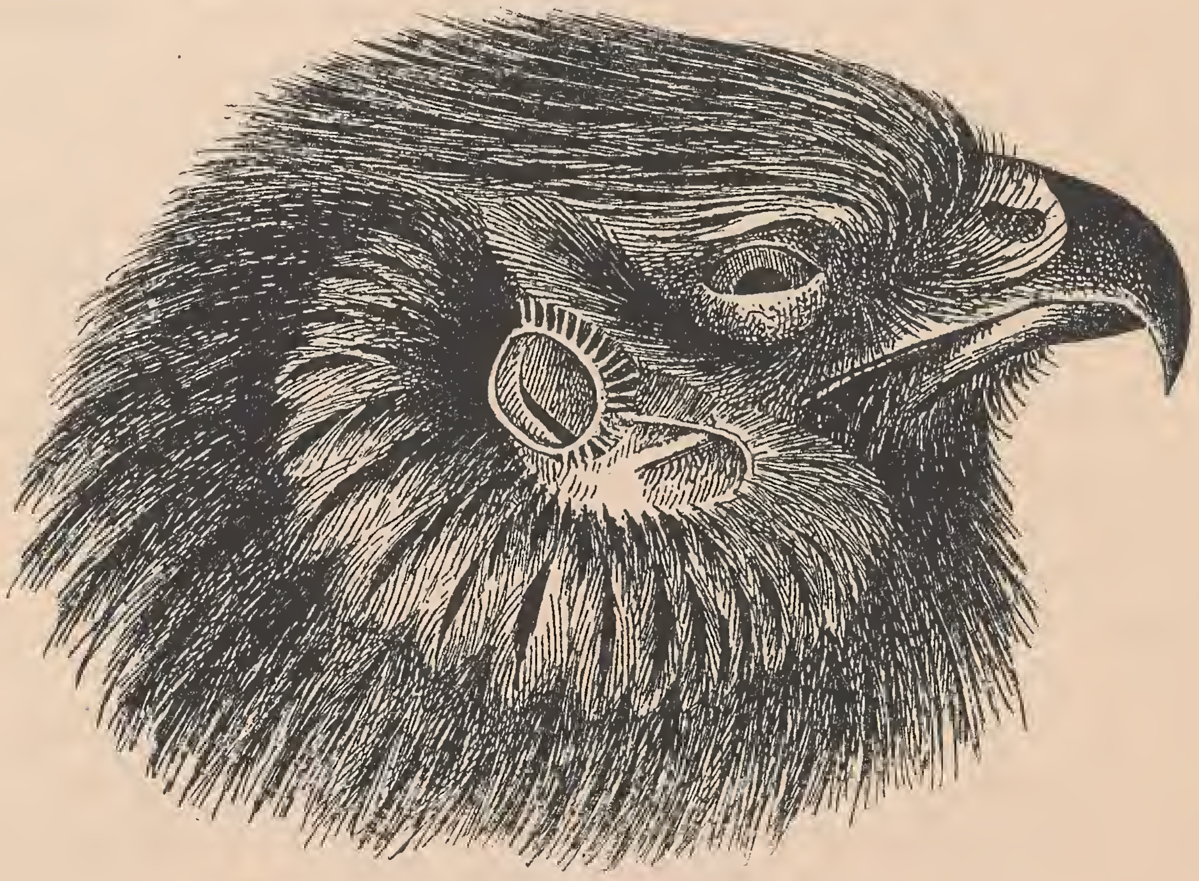
The Harriers were at one time placed near the Owls on account of their Owl-like faces and the position of the ear, but they are not now regarded as having any real relationship with that group. I will comment upon this in connection with the Owls, but it is remarkable that these birds are externally so similar and also that the Falconiformes among themselves show so great superficial likenesses. The only conclusion possible is that in this Order we must be guided to a very great extent by the anatomical worker, and in every case yet such have become unqualified genus-splitters.

Two species of *Circus* occur in the Australian Avifauna, and for one of them Kaup proposed the subgenus *Spilocircus.* In structure it agrees very closely with typical *Circus*, but the adult has a very beautiful spotted plumage quite unique in the group. The immature plumage, however, agrees with that of members of the typical subgenus, and I have not therefore recognised the group. However, I would note that probably anatomical investigation will compel its recognition, and I would record that Pycraft, following Suschkin, in the paper previously dealt with includes as genera *Circus* and *Strigiceps.* I have not differentiated the latter from an examination of skins alone, and have not separated it here because I do not know what is meant by *Strigiceps* at that place, as no species names are given. Bonaparte in the *Consp. Gen. Av.*, Vol. I., p. 34, 1850, admitted two genera, *Circus* and *Strigiceps*, and included under the latter the above-mentioned *Spilocircus*, which is superficially wrong, as it agrees better with *Circus.*

Gray, in the *Handl. Gen. Spec. Birds*, Vol. I., 1869, p. 37, included *Strigiceps* as a subgenus for *cyaneus*, not for *pygargus* as now recognised, and it is impossible to guess Suschkin's or Pycraft's usage at the place mentioned.

As a matter of fact, the correct name for the *pygargus* group, if separable, would be *Pygargus* Koch, as given in my synonymy, which has twenty years priority over *Strigiceps.* If the *Pygargus* group be recognisable from anatomical examination, it is almost certain that the group *Spilocircus* will also strongly differ and add another to the strange endemic Australian avian forms.

Since the preceding was written, I observed on reference to Meyer and Wiglesworth's *Birds of Celebes*, 1898, Vol. I., p. 8, the following note: "The similarity of the adult plumage of this Harrier (*Circus assimilis*) to that of certain species of *Spilornis* is worthy of notice. The type of coloration may be ancient. It should be remarked that Gurney, whose arrangement of the Falconidæ we follow, places the subfamily *Circinæ* much nearer to the *Circaëtinæ* (containing *Spilornis*) than has been the custom of other authors." This led me to look up the species of *Spilornis*, a genus foreign to the Australian fauna, but living to the North, in the Philippines, etc., and I found species with the under-parts exactly similar to the strangely coloured *Circus assimilis*. To me this suggested relationship: as structural characters in these birds appear to be more recent than coloration, as is seen in the case of species of *Accipiter* and *Astur*. Reference to Pycraft's paper shows that from osteological features Gurney's arrangement has been confirmed, as there the Circinæ come practically next to the Circaëtinæ as follows: "The Circaëtinæ include *Circaëtus*, *Geranospizias*, *Helotarsus* and *Spilornis*. Closely allied, and intermediate between it and the next subfamily—the Circinæ—comes the highly-specialised Polyborinæ. It seems to me that this subfamily might perhaps as well be included in the Circinæ, with which, as Dr. Suschkin shows, it has many characters in common, and in this I can confirm him. The Circinæ embrace *Circus*, *Geranospizias*, *Urotriorchis* and *Strigiceps*." It is quite possible that specimens of *Circus assimilis* were not available, or if at hand, comparisons were not instituted between them and *Spilornis*, as no mention is made of species, group names simply being cited. It will be interesting to investigate the osteology of *Circus assimilis* in this connection.



CIRCUS APPROXIMANS GOULDI.

Key to the Species.

A. Under-surface buffy white narrowly streaked with chestnut brown .. .. *C. approximans*, p. 24.

B. Under-surface bright rufous, spotted and streaked with white .. .. *C. assimilis*, p. 18.

No. 291.

CIRCUS ASSIMILIS.

SPOTTED HARRIER.

(Plate 234).*

Circus assimilis Jardine and Selby, Illus. Ornith., Ser. 1, Vol. II., pl. 51, 1828: near Sydney, New South Wales.

Circus assimilis Jardine and Selby, Illus. Ornith., Ser. 1, Vol. II., pl. 51, 1828; Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 63, 1874; Ramsay, Proc. Zool. Soc. (Lond.), 1875, p. 580 (Q.); Gurney, Ibis 1875, p. 225; *id.*, List Diurnal Birds Prey, 1884, p. 23; Ramsay, Proc. Linn. Soc. N.S.W., Ser. 2, Vol. I., p. 1096, 1887 (N.W.A.); Legge, Proc. Roy. Soc. Tasm. 1886, p. 237, 1887 (Tasm.); Ramsay, Tab. List Austr. Birds, p. 1, 1888; North, Aust. Mus. Cat., no. 12, p. 1, 1890; Broadbent, Proc. Roy. Soc. (Queensland) 1888, p. 16 (Q.); Cox and Hamilton, Proc. Linn. Soc. N.S.W., Ser. 2, Vol. IV., p. 397, 1889 (N.S.W.); North, *ib.*, p. 1023, 1890 (N.W.A.); *id.*, Austr. Mus. Cat., no. 12, p. 1, 1890; *id.*, Austr. Mus. Cat., no. 4, p. 1, 1898; Hall, Key Birds Austr., 1st ed., 1899, p. 3; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 1, 1901; Littler, Emu, Vol. II., p. 169, 1903 (Tasm.); Carter, *ib.*, Vol. III., p. 31, 1903 (N.W.A.); Berney, *ib.*, Vol. V., p. 15, 1905 (N.Q.); Hall, Key Birds Austr., 2nd ed., 1906, p. 3; Mathews, Handl. Birds Austral., p. 39, 1908; Crossmann, Emu, Vol. IX., p. 86, 1909 (W.A.); Ogilvie-Grant, Ibis 1910, p. 171 (W.A.); Littler, Handb. Birds Tasm., p. 2, 1910 (Tasm.); North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 176, 1911; Mellor and White, Emu, Vol. XII., p. 161, 1913 (Flinders Island); Mellor, *ib.*, p. 189 (S.A.); Agnew, *ib.*, Vol. XIII., p. 94 (Q.); Barnard, *ib.*, p. 206, 1914 (N.T.); *id.*, *ib.*, Vol. XIV., p. 41 (N.T.); Cheney, *ib.*, p. 203, 1915 (Vict.).

Circus jardinii Gould, Synops. Birds Austr., pt. III., pl. 48, 1838 (N.S.W.); *id.*, Proc. Zool. Soc. (Lond.) 1837, p. 141, 1838 (N.S.W.); Gray, Genera Birds, Vol. I., p. 32, 1845; Gould, Birds Austr., Vol. I., pl. 27, 1848; Sturt, Exped. Centr. Austr., Vol. II., App., p. 16, 1849; Gould, Handb. Birds Austr., Vol. I., p. 60, 1865; Diggles, Orn. Austr., pt. XII., pl. 12, 1867; Gray, Handl. Gen. Sp. Birds, Vol. I., p. 37, 1869; A. G. Campbell, Emu, Vol. II., p. 10, 1902 (Vict.); Stone, Austral Avian Rec., Vol. I., p. 145, 1913.

Spilocircus jardinii Kaup, Isis 1847, pp. 89-102.

Strigiceps jardinii Bonaparte, Consp. Gen. Av., Vol. I., p. 34, 1850.

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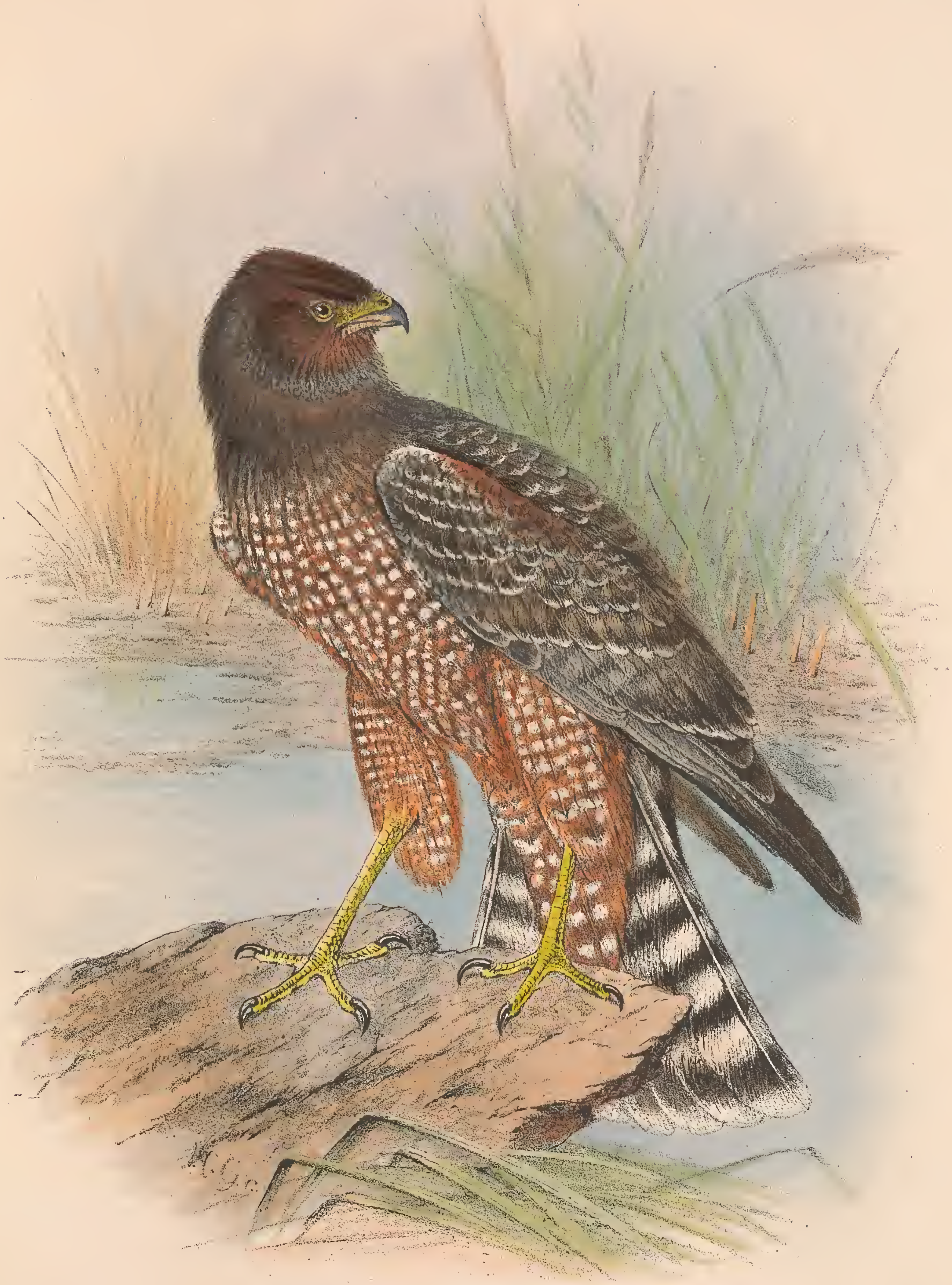
* The Plate is lettered *Circus rogersi.*



H. Grönvold, del.

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CIRCUS ROGERSI.

(LESSER SPOTTED HARRIER).

18-5

SPOTTED HARRIER.

Circus assimilis assimilis Mathews, Nov. Zool., Vol. XVIII., p. 244, 1912 ; *id.*, List Birds Austr., p. 102, 1913.

Circus assimilis rogersi Mathews, Nov. Zool., Vol. XVIII., p. 244, 1912 : Fitzroy River, North-west Australia ; *id.*, List Birds Austr., p. 102, 1913.

RANGE. Australia ; Tasmania. Extra-limital.

Three subspecies may be recognised, but their distribution is not well determined : one from East Australia, one from North-west Australia, and one from Celebes, etc.

Meyer and Wiglesworth (Birds of Celebes, p. 9, 1898) wrote : " If stationary, differences might be expected to have arisen between Celebes and Australian birds : nevertheless, the numerous specimens in the British and Leyden Museums appear to be quite similar." I record differences hereafter.

Adult female. Upper-surface ash-grey, or blue-grey everywhere spotted with white ; head and hind-neck dark brown, the feathers broadly margined with rufous ; back, rump and upper tail-coverts greyish-brown with twin grey spots on each feather ; on the scapulars the twin spots have developed into bars ; lesser wing-coverts greyish-brown tipped with rufous and barred with white or grey; median coverts like the back, greater coverts like the scapulars ; primary-quills almost uniform black mottled with rufous on the inner webs and crossbars of dark brown and hoary grey on the outer webs ; bastard-wing, primary-coverts and secondaries blue-grey with dark cross-bars and edged with whitish at the tips with, more or less, sandy-buff on the inner webs ; the feathers on the sides of the rump rufous with twin white spots ; tail grey with six dark brown cross-bars ; sides of face and throat rufous ; ruff on lower throat grey edged with rufous ; entire under-surface, including the under wing-coverts and under tail-coverts, rufous streaked or spotted with white. Bill black, iris yellow ; cere olive-yellow ; tarsi and feet yellowish-green. Total length 600 mm. ; culmen 34, wing 454, tail 290, tarsus 100. Collected at Blackwood, South Australia.

Adult male. Similar to the adult female but smaller.

DISTRIBUTION. Queensland, New South Wales ; Victoria ; Tasmania ; South Australia ; South and Mid-west Australia.

Birds from North-west Australia and Northern Territory are much darker than those from the eastern part of Australia.

Adult male. General colour above dark slate-grey with white or grey spots and edgings to the feathers ; head dark brown intermixed with maroon chestnut, this colour becoming uniform on the throat and sides of face ; lesser wing-coverts on inner portion of wing maroon-chestnut with twin spots of white, outer lesser coverts lead-grey also with twin spots of white like the median and greater coverts ; quills much the same as in the female described above but the darker feathers on the sides of the rump have white spots ; tail grey crossed by six dark brown bars and tipped with white ; under-surface rich chestnut everywhere spotted or streaked with white. Bill bluish-black ; cere olive-yellow ; eyes and feet yellow. Total length 565 mm. ; culmen 30, wing 393, tail 250, tarsus 90. Figured. Collected on the Fitzroy River, North-west Australia, in August, 1898.

Adult female. Same as the adult male but larger. Wing 437 mm., tarsus 99. Collected at Alexander, Northern Territory, in June, 1905.

Immature female. Similar to the adult female described from South Australia but with more rufous spotting above, especially on the wing-coverts ; hind-neck more streaked with rufous ; under-surface rufous-brown longitudinally streaked with white ; under wing-coverts and axillaries spotted much the same as those already described. Wing 428 mm. Collected at Alexander, Northern Territory, in August, 1905.

Nest. A loosely-constructed platform composed of sticks and lined with leaves and placed in a tree.

Eggs. Clutch three ; ground-colour bluish-white, no gloss, inside of shell green. Axis 50 to 51.5 mm. ; diameter 37-39 (Queensland), 47-48 by 36.5 (Victoria).

Breeding-season. August, September and October.

THOUGH not a very uncommon bird, but of striking appearance, this bird was only differentiated and described in 1837 by Gould.

Previously, however, it had apparently been included in the accounts of voyagers under the general title of "Hawks." Though Gould was the first to recognise this bird as new and different from another common Harrier, his name has been obliterated, as the first name given to an Australian Harrier proved to have been applied to the young of this and not to the commoner bird as Gould supposed.

Gould's determination existed unquestioned for almost forty years, from 1837 to 1874, until Sharpe monographed the group in the first volume of the *Catalogue of the Birds in the British Museum.* Though the alteration made was one of absolute transference, such as now is regularly quoted as a most confusing correction, no such confusion appears to have occurred. Immediately the necessary emendation was made and no argument seems to have arisen. Indeed, Gurney's comment (*Ibis* 1875, p. 225) reads: "In treating of the two Australian Harriers, Mr. Sharpe correctly applies the specific name of *C. assimilis* to the species figured in Mr. Gould's 'Birds of Australia' under the name of *Circus jardinii,* and that of *C. gouldi* to the Harrier figured by Mr. Gould under the name of *Circus assimilis.*"

To me Jardine and Selby's bird appeared somewhat abnormal, and I note, in confirmation, the following memo. made by Meyer and Wiglesworth (*Birds of Celebes,* p. 7, 1898): "The type of *Circus assimilis* J. and S. in the British Museum is immature and not normal, differing from all other specimens there of this species in the coloration of the wings and tail. The tail is nearly uniform brownish-ashy with a rufous wash at its sides, marked with three or four imperfect bars of brown towards the base, followed by a clear space, with an imperfect terminal bar. Upper tail-coverts white, a few of the longer ones with a bar of brown towards the tip."

There are not many notes about this bird, probably on account of its fairly common occurrence, but more probably also on account of its shyness.

Mr. T. P. Austin, writing from Cobbora, New South Wales, states: "The Spotted Harrier is usually seen flying low, only a few feet above the ground, and mostly over a crop, swampy ground, or open plains covered with long grass; they fly very slowly, working their way all over a field backwards and forwards hunting for food sometimes the whole day long, and often for several days over the same paddock. Its flight does not resemble that of any other bird of prey that I know of. Nowhere have I known this species at all plentiful, but odd birds are to be seen in a great many districts which I have visited: here they mostly arrive in the spring, but on an average I only see about one bird in three years. Only once have I known of a nest, about thirty years ago, and from which an uncle of mine took a pair of eggs; the nest was placed in a large red gum-tree growing on the bank of the Barwon River, on Barwon Park Station, Winchelsea, Victoria. At that time, in that district the bird was always known as the Slatey-backed Hawk. As far as my own experience is concerned they are quite harmless; I have never ever known them to attack small chickens."

From South Australia Captain White wrote: "*Circus assimilis* was fairly plentiful at the Reed-beds, in fact all over the Adelaide plains, some 30 to 40 years ago (it is many years since they were seen here now). I distinctly remember these birds hawking over the standing crops where they used to nest on the ground; they hawk over the salt-bush in the north in the same manner, where they nest in trees, but I have never found a nest myself in a tree."

Dr. A. Morgan's note is better reading, as the extermination of such a splendid bird would be much regretted: "*Circus assimilis* is found all over the southern parts of South Australia, very common at Kallioola, occasionally seen as far south as Lake Alexandrina, but it is rare there. At Kallioola they were generally seen hawking over the salt-bush flats, but I did not find out what they were feeding on. They build a large stick nest generally in a gum-tree and lay three white eggs, lined with a green skin. Two clutches in my collection were taken—the first at Stone Hut, 145 miles N. of Adelaide in September, 1893, and the second at Kallioola, Lake Torrens, on September 16, 1912."

Berney, from the Richmond District, North Queensland, records in the *Emu*, Vol. V., p. 15, 1905: "Not uncommon. On the wing their movements are slow and measured, as they beat round the edge of a swamp or along the edge of a bulrush-covered bore stream. Again, stretching their wings high above their back, often at nearly a right angle to one another, the extremity of the primaries turned upwards, they sail for a couple of hundred yards on rigid pinions, and using the line of the vertebral column as an axis, they roll from side to side like a ship at sea. They seldom rise to any height—just sufficient to clear natural obstacles—and when flying they carry their legs extended straight out under the tail, shifting them, still extended, to a right angle with the body to regulate the balance upon any sudden turn becoming necessary, on the sighting of a desired lizard or grasshopper. They are handsome-plumaged birds, spotted above, while the under-surface of the wings looks like mother-of-pearl. Though the bulrush beds are their favourite haunt, they also hunt the open downs."

North, in the *Austr. Mus. Spec. Cat.*, no. 1, Vol. III., 1911, p. 177, records notes from various observers, but these mainly relate to nests and eggs alone. As regards habits Bennett had informed him: "*Circus assimilis* is in these parts (near Booligal, N.S.W.) of migratory habits, usually arriving about the end of August and departing again, after breeding, about February. It frequents the plains and open country, being rarely found in thick timber, and it preys chiefly upon small reptiles and such birds as Quail, Larks, etc., to which is added large insects such as grasshoppers and Mantis."

Macgillivray noted: "Examples of *Circus assimilis* may often be seen sailing and flapping their way slowly over the plains in search of food. On the wing they are easily distinguished from their congeners by the general light grey colour, and when seen from underneath, the black tips of the wings serves still further to distinguish them." There is a note from Keartland regarding their boldness in attacking rabbits and ferrets. North also notes that in the Australian Museum collection there are specimens obtained by Mr. George Masters at King George's Sound, West Australia. Shortridge also noted, as recorded by Ogilvie-Grant, *Ibis* 1910, p. 171, that: "The Allied Harrier does not appear to be confined to swampy situations, as it was observed in the central and western divisions as well as on Bernier Island. It is probably less numerous than *Circus gouldi* in the south-western division."

What the South-western birds are like I am unable to decide, but those from the North-western I separated subspecifically, and the characters of that form seem to be fairly constant. I state this as so far my experience has been that nearly all the members of this Order are variable, and while a few specimens can be easily determined, a larger number makes subspecies very uncertain quantities. The differences in size between the sexes, the plumage-changes and the time these take, and the continual moult, all serve to complicate the attempted separation of these birds into subspecies until the personal equation becomes omnipresent.

According to my examination the birds from Celebes and the northern islands differ in their very slatey-blue backs and throats, and upper chest with very little spotting, and this bluish colouring pervades the colouring of the lower breast. I propose to name this form

Circus assimilis quirindus, subsp. nov.

to draw attention to my results.

North noted as regards Australian birds as a whole: "Apart from the great variation in the young and adult of this species, a great difference may be observed also in individual adult specimens. Some have the entire undersurface spotted with white, others have the fore-neck pale bluish-slate colour like the facial ruff." He was not interested in the discrimination of subspecies, so that I do not know whether the differences noted had any geographical significance.

From the habits above recorded, this species demands osteological examination in order that its systematic position be accurately determined. It would not surprise me to find that it was a near relative of *Spilornis* masquerading as a *Circus*.

The following note given by Mr. Tom Carter refers to the North-western form *Circus assimilis rogersi*: "The Spotted Harrier is one of the commonest birds of prey in the North-west, being most numerous in good seasons. At such times one or two of the birds are hardly ever out of sight, but they are very wary. With flapping flight they skim over scrub and grassy flats, systematically beating the ground for lizards, which seem to be their favourite food, but on several occasions I have known them (usually birds in immature plumage) attack poultry very determinedly. The breeding-season commences about the middle of July, but the building of the nest is sometimes started much earlier. I noted a pair of birds commencing a nest in the middle of April, 1898, but it was August 17th before it contained three eggs. The birds seemed to leave it for a while and then return to it. The nest was a large flat structure, built in the main fork of a stunted tree, at a height of eight feet above the ground. On August 27th of the same year I took one egg, much incubated, from a nest. It was the only egg. The following day I found two half-grown young in another nest, about forty feet from the ground, in a white gum-tree. Between the dates of July 17 and 28, in 1900, I found several nests containing eggs or young. The largest clutch was four, but three is the usual complement. The latest date on which I have noted eggs was September 13, 1900, when a clutch of three fresh eggs was taken. Sometimes the nest is built on a bush not more than five or six feet from the ground, but it is always flat and wide, built of twigs and lined with leaves of trees. Lizards of considerable size are often found in the nests when they contain eggs. I imagine they are brought for the sitting bird by its mate. I have never observed this species in the South-west."

No. 292.

CIRCUS APPROXIMANS.

ALLIED HARRIER (SWAMP-HAWK).

(Plate 235.)*

Circus approximans Peale, U.S. Expl. Exped., Vol. VIII., p. 64, 1848; Fiji Islands.

Circus gouldi Bonaparte, Consp. Gen. Av., Vol. I., p. 34, 1850: Austr(alia)=New South Wales.

Circus assimilis (not Jardine and Selby) Gould, Birds Austr., Vol. I., pl. 26, 1848; *id.*, Handb. Birds Austr., Vol. I., p. 58, 1865; Gray, Handl. Gen. Sp. Birds, pt. I., p. 36, 1869.

Circus gouldi Bonaparte, Consp. Gen. Av., Vol. I., p. 34, 1850; Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 72, 1874; Gurney, Ibis 1875, p. 225; Ramsay, Proc. Zool. Soc. (Lond.) 1875, p. 580 (Q.); *id.*, Cat. Austr. Acc., p. 6, 1876; *id.*, Proc. Linn. Soc., N.S.W., Vol. II., p. 177, 1878; *id.*, *ib.*, Ser. 2, Vol. II., p. 165, 1887 (N.W.A.); *id.*, Tab. List Austr. Birds, p. 1, 1888; Broadbent, Proc. Roy. Soc. (Queensland), Vol. V., p. 16, 1888 (Q.); North, Austr. Mus. Cat., no. 12, p. 2, 1890; Hall, Key Birds Austr., p. 4, 1899; Campbell, Nests and Eggs Austr. Birds, p. 2, 1901; A. G. Campbell, Emu, Vol. II., p. 10, 1902 (Vict.); *id.*, *ib.*, p. 205, 1903 (King Island); Le Souëf, *ib.*, p. 222, pl. xii. (Tasm.); W. V. L(egge), *ib.*, Vol. III., p. 190, 1904 (Tasm.); D'Ombrain, *ib.*, Vol. IV., p. 125, 1905 (Vict.); Berney, *ib.*, Vol. V., p. 15, 1905 (N.Q.); Hall, Key Birds Austr., 2nd ed., p. 4, 1906; Batey, Emu, Vol. VII., p. 3, 1907 (Vict.); Legge, *ib.*, Vol. VII., p. 144, 1908 (Tasm.); Fletcher, *ib.*, Vol. VIII., p. 80, 1908 (Tasm.); Mathews, Handl. Birds Austral., p. 39, 1908; Fletcher, Emu, Vol. IX., p. 80, 1909 (Tasm.); Mathews, *ib.*, Vol. X., p. 107, 1910 (N.W.A.); Ogilvie-Grant, Ibis 1910, p. 171 (S.W.A.); Littler, Handb. Birds Tasm., p. 1, 1910 (Tasm.); North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 179, 1911; Barnard, Emu, Vol. XIII., p. 206, 1914 (N.T.).

Circus approximans Gurney, List Diurnal Birds Prey, p. 21, 1884; Legge, Pap. and Proc. Roy. Soc. Tasm. 1886, p. 237, 1887; North, Austr. Mus. Cat., no. 4, p. 3, 1898; Mathews, Nov. Zool., Vol. XVIII., p. 10, 1911.

Circus approximans gouldi Mathews, Nov. Zool., Vol. XVIII., p. 245, 1912; *id.*, List Birds Austr., p. 102, 1913.

Circus approximans inexpectatus Mathews, Nov. Zool., Vol. XVIII., p. 245, 1912: Parry's Creek, North-west Australia; *id.*, List Birds Austr., p. 102, 1913.

Distribution. Australia; Tasmania.

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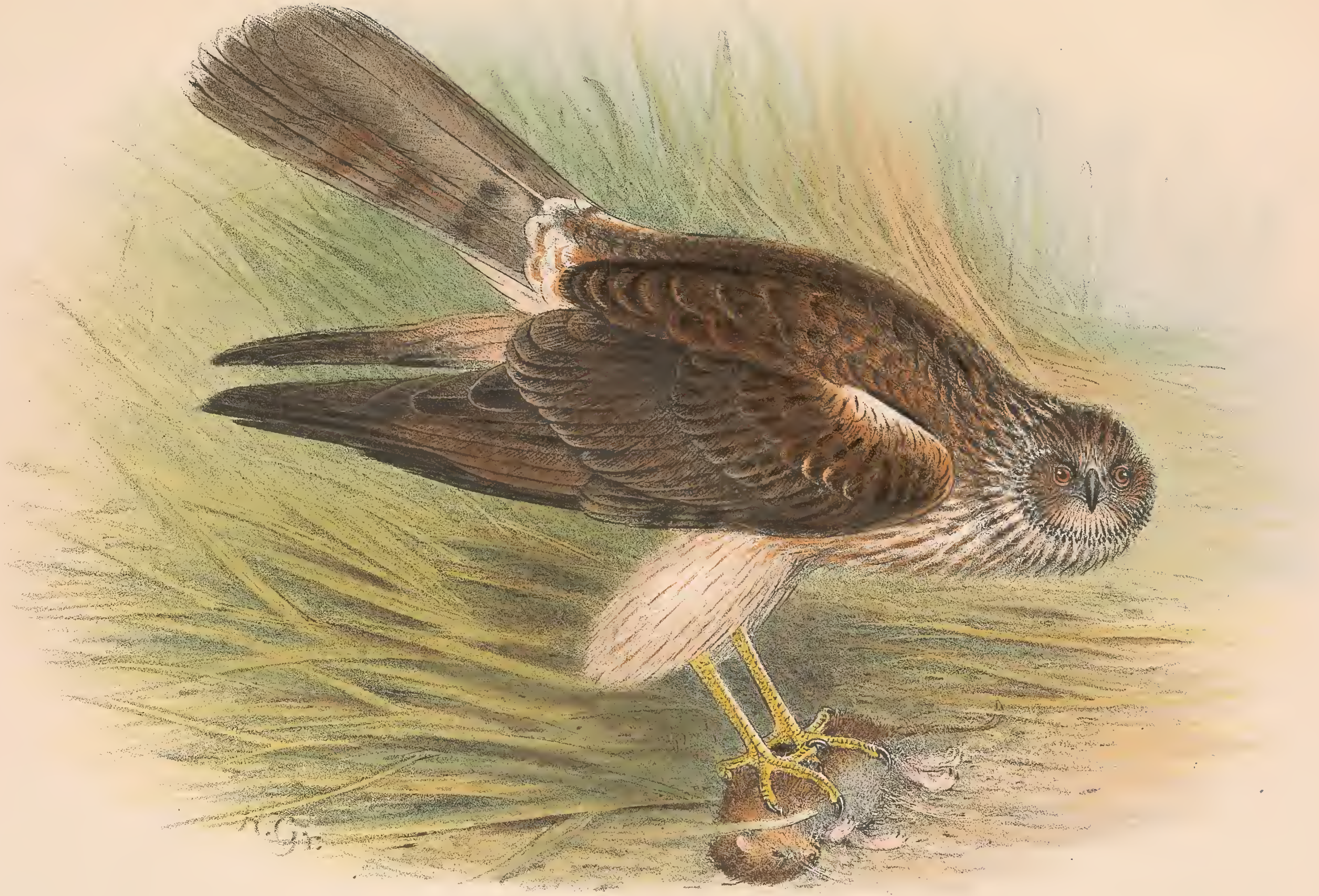
* The Plate is lettered *Circus gouldi.*



H. Grönvold, del.

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CIRCUS GOULDI.

(ALLIED HARRIER).

ALLIED HARRIER (SWAMP-HAWK).

Adult female. General colour of the upper-parts dark brown with pale tawny and rufous edgings to the feathers; crown of head pale rufous with dark centres to the feathers; the feathers of the hind-neck and sides of neck dark brown with tawny margins; back and scapulars dark brown with pale edgings to the feathers; lower back and rump similar with broader rufous edgings to the feathers, as also the upper tail-coverts which have whitish tips; lesser, median, and greater wing-coverts broadly tipped with rufous and edged with whitish; bastard-wing grey, barred and tipped with dark brown with a fringe of white, primary-coverts similarly marked; outer primary-quills uniform dark brown mottled with rufous on the inner-webs near the base, inner primaries and secondaries dark brown crossed with blackish bars and more or less rufous on the inner webs, also fringed with white at the tips; tail brown crossed by seven blackish bands broadly tipped with whitish, and more or less rufous on the inner webs; facial ruff pale rufous and narrowly lined with black; throat, fore-neck, breast, and sides of body tawny rufous narrowly streaked with brown; abdomen and under tail-coverts similar but paler; thighs uniform buffy-white; axillaries and under wing-coverts similar but more rufous; the greater under wing-coverts grey barred with brown and tinged with rufous. Bill lead-blue; iris pale brown; cere olive-grey; tarsi and feet greyish-white. Total length 600 mm.; culmen 31, wing 436, tail 390, tarsus 102. Collected on the Richmond River, northern New South Wales, in March, 1876.

Adult male. Similar to the adult female but smaller and darker above, and the stripes on the breast-feathers more pronounced. Wing 425 mm., tarsus 94. Figured. Collected at Botany Bay, New South Wales, in July, 1894.

Immature female. General colour of the upper-surface almost uniform dark brown, the feathers of the head and hind-neck slightly fringed with tawny rufous; tail grey with five dark cross-bars, outer-feathers tinged with tawny rufous; facial ruff and entire under-surface rich rufous-brown. Wing 431 mm., tarsus 99. Collected in the Victorian Alps in April, 1887.

Immature male. Dark brown above with pale rufous or whitish margins to the feathers; upper tail-coverts white with a rufous-brown subterminal bar; quills more hoary-grey on the outer webs and more rufous on the inner ones; tail-feathers more grey, the dark cross-bars fewer in number, more or less obsolete, and reduced to spots, the outer feathers more rufous and the tips whiter; the under-surface paler rufous and more broken up into streaks. Wing 407 mm., tarsus 93. Collected at Botany Bay, New South Wales, in August, 1894.

Nestling. Covered with down; second plumage undescribed.

The birds from North-west Australia and Northern Territory are very similar to the female described, but distinctly more buff below and smaller. A male collected on Parry's Creek, North-west Australia, on the 22nd of January, 1909, by Mr. J. P. Rogers measures: total length 560 mm.; culmen 28, wing 376, tail 240, tarsus 88, and is the type of *C. a. inexpectatus.*

Nest. A flatish platform composed of sticks, etc., and lined with grass placed on the ground near a swamp. Outside measurements 18 inches wide by 8 inches deep: inside 6 inches by 2½ inches deep.

Eggs. Clutch three to five; ground-colour bluish-white without gloss. Inside of the shell green, lighter than those of *assimilis.* Axis 50-55 mm., diameter 39-40. (Tasmania, November.)

Breeding-season. September to January.

THE early history of this common bird is lost in obscurity, having apparently been included, without differentiation, in the general term of "Hawks."

This is less remarkable than in the case of the previous species, as that is a striking and beautiful bird, while this shows no very noticeable characters.

Even when Harriers were determined from Australia a confusion took place, as the adult of this species resembles the juvenile of the previous one, and the latter being described, the name was wrongly associated with the present species.

In Gould's "Birds of Australia" this bird was figured under the name *assimilis* and this usage was continued until 1874, as related previously.

In the *Consp. Gen. Av.*, Vol. I., p. 34, 1850, Bonaparte recognised that two species had been wrongly named and therefore proposed:

"*Circus gouldi* Bp. (*assimilis* Kaup, Gray, partim) ex Austr. Similis *C. æruginoso,* nec Strigicipi jardinii, sed major."

When Sharpe made the correction, which was confirmed by Gurney, he selected this name for the Australian bird which ranged to Fiji, New Caledonia and New Zealand. Gurney had separated the New Caledonian bird as *C. wolfi*, but Sharpe lumped this, to which Gurney objected. The latter also indicated the recognition of *approximans* Peale instead of *gouldi* Bonap., and in the *List Diurnal Birds Prey,* 1884, p. 21, used Peale's name, giving the following footnote (p. 22): "I find that the Harrier of the Fiji Islands (*Circus approximans*) is, as stated in Mr. Sharpe's volume, identical with *C. gouldi* of Australia and New Zealand. In my last note in the *Ibis* above referred to (1876, p. 384), I mentioned that as the only Fijian Harrier which I had examined was immature, I felt doubtful whether it should be referred to *C. gouldi* or *C. wolfi*; but I have since ascertained its identity with the former by the inspection of two adult males, kindly lent to me by Captain Wardlaw Ramsay, which were obtained by Mr. Layard at Bua Vanua Levu in the Fiji Islands. As the specific name '*approximans*' was applied by Peale to this Harrier in 1848, it has priority over that of '*gouldi*' proposed for it by Bonaparte in 1850 and adopted in Mr. Sharpe's volume and also in my notes, as well as in Mr. Buller's *Birds of New Zealand*."

This clearly-made correction was misunderstood as applicable to the Australian bird, though three attempts have been made to enforce its use. Legge in his "Systematic List of Tasmanian Birds" in 1887 introduced it, but no one followed him. North, in the second edition of the Australian Accipitres in 1898 then accepted it, but as the following year Sharpe in the *Handl. Birds*, Vol. I., p. 246, continued the misusage of *gouldi*, North abandoned the correct view and in 1911 reverted to *gouldi*. In the same year I revived Peale's name in the *Nov. Zool.*, Vol. XVIII., p. 10, 1911, and have since continually used it as the specific name, though recently admitting the Australian form as subspecifically separable under the name *gouldi*. I will discuss the forms later on.

Captain S. A. White wrote me from South Australia: "This bird was very abundant at the Reed-beds, when much swamp land was covered in dense reeds and flags, but since the reclaiming of the land and the disappearance of the flags and reeds, these birds have almost forsaken us. One of the first nests I remember taking was a swamp-hawk's: they were fond of building in the thick flags, where they made a neat nest, and the general clutch was four eggs, though some have had six. These birds are plentiful along the margins of our lakes and the back waters of the Murray where flags and reeds grow.

"They are very bold birds, and when shooting duck I have known them to carry off ducks I had shot before I could get into the water after them. The male bird is very conspicuous with his patch of white on the rump: when hawking over the reed-beds every turn of the body displays the white upper tail-coverts. Their cry is at times a harsh call and at others quite a whistle."

Dr. A. Morgan's notes read: "A very common bird throughout the southern parts of South Australia, where it is generally known as the 'swamp-hawk' or 'wheat-hawk' from its habit of hawking over swampy country and crops of standing wheat. It is still quite common within a few miles of Adelaide, where it breeds in the crops. It lives upon ducks, small birds and mice, which it catches by pouncing upon them as it skims over reed-beds and marshes. The nest is always built upon the ground and made of small sticks, reeds and long grasses; the eggs are white with a green lining and vary in number from two to six, the most usual number being three: all the eggs in my collection were taken in November."

Mr. T. P. Austin, from Cobbora, New South Wales, states: "Only twice have I seen the species in this district, a single bird each time, but in the Winchelsea district, Victoria, they were very plentiful, also all through the Ararat district; in both districts I have often seen their nests, the foundation of which was usually composed of large dead stems of the common black (Scotch) thistle lined with a little dry grass, the whole nest being most carelessly arranged, usually placed in long rushes in a swamp, and only a few inches above the surface of the water, but more than once I have seen nests placed in bulrushes growing in very deep water in lagoons and holes in a river. On Barwon Park Station, Winchelsea, Victoria, many years ago, their nests were very plentiful: while walking along a creek one morning I found five nests within a mile. They appear to lay their eggs at long intervals: often have I seen young in a nest in various stages of growth, from just hatched up to about half-fledged birds. In the spring of 1899 I saw a nest containing two eggs and three young birds: the latter were from only a few days old up to partly-feathered birds; upon examining the nest again a week later there were five young birds in the nest—one appeared to have only been hatched that morning, the next smallest was a few days old."

Mr. Tom Carter, from Broome Hill, South-West Australia, observes: "*Circus gouldi* takes the place of *Circus assimilis* in the South-west, but is not usually found far away from lakes or swamps, above which it searches for food in much the same manner as *assimilis.*"

Little was known of its economy in Gould's time, but he notes its resemblance to the Marsh Harrier of Europe in habits, and reproduces a note by Mr. White of Adelaide (Capt. S. A. White's father) thus: "This bird is very numerous in South Australia during the summer months, and is generally found in swampy situations. I have seen it on the Murray, and in many other places. It feeds on eggs, birds, reptiles, and indeed on almost everything. I have often observed it flying close over the tops of the reeds, when quite dark. Its cry is a kind of loud shrill whistle of one note. At times it will fly very high. It varies much in colour: the two sexes are much alike, but the female is the larger bird of the two."

Much has been since recorded as hereafter given.

A. G. Campbell, writing of the birds of North-eastern Victoria (*Emu*, Vol. II., p. 10, 1902), noted: "The Spotted Harrier (*Circus jardinii*) and the common Harrier (*C. gouldi*) are local birds, the former preferring for its domain a patch of reed-beds, and the latter seemingly with more delight for a crop of wheat or long grass, where it can hunt up and down for such provender as Quails and young hares, and where often its nest is to be found."

In the same place, p. 222, Mr. Le Souëf recorded the following: "An interesting phase in the nesting of this bird lately came under my notice in Tasmania. Last October, Mr. R. W. Legge, of Cullenswood, found a nest of this Harrier situated among some rushes growing in swampy land. The nest contained three fresh eggs, and he took one for Col. Legge, his father, leaving the other two. In December following, I paid the nest a visit with Mr. Legge, and we were surprised to find that the female bird had laid another clutch of three eggs, and that two were hatched out. Of the first clutch of three, one was taken, another was addled, and the third hatched out, but when the youngster was about a fortnight old the hen bird had again laid another clutch of three, of which two hatched out, and the other was also close on hatching: consequently, when one of the parent birds was sitting on the second clutch, the feeding of the young one must have devolved on the non-sitting bird. One would naturally have thought that the young one, about a month old, would have eaten his small brothers and sisters, but apparently he didn't: he looked very comical, sitting on the edge of the nest in a defiant attitude (see Plate xii.) and the two little ones in the centre trying to hide behind the other, and rolling the two eggs about in their efforts to do so. The parent birds must have had a very busy time of it keeping their two broods supplied with food. I subsequently learnt of a second case near Avoca (Victoria) which was almost similar, except that there were no eggs in the nest, only one young one about a month or six weeks old, and three about a week old, which shows that these birds do occasionally rear double clutches."

In the next volume, p. 190, Colonel Legge added more notes: "With reference to Mr. Le Souëf's note on the breeding of the Harrier (*Circus gouldi*) at Cullenswood, those birds have resorted to the same lagoon for many years past, varying their time for nesting slightly in accordance with the season whether wet or dry, so that the locality is sufficiently free from water. Some years back the nests used to be on some slight eminence, of which there are several at the nesting-site, caused by the accumulation of silt round tussocks among the reeds, but now they usually resort to the dead level of the lagoon. Originally the ancestors of that pair of Harriers bred in a small lagoon of about three acres in extent much nearer the homestead, but after it was drained they forsook that side and took to the present one. During the breeding-season these Harriers are destructive to poultry, coming about the houses in search of chickens for their young, and every year we lose a few from our yards. Young rabbits also form part of their prey, and taking them all the year round they do more good than harm—certainly in a rabbit-infested district. Before the breeding-season it is their habit to soar high in the air, similarly to the Brown Hawk (*Hieracidea*), uttering a shrill scream. In all open marshy districts these birds form the most attractive objects of their family, as they 'course' gracefully over the land, often for considerable distances, with outstretched wings, in search of their prey, and at such times no doubt often pick up an unwary Quail. The Harrier, with its long tarsus, makes a good object-lesson of the manner in which birds of prey use their talons. When pursued by Magpies, as they so often are in the breeding-season, the latter coming up behind them and often above them with great speed, the Harrier will, when taken unawares, perhaps, turn around on its side and strike out the long leg and talons nearer its pursuer with lightning-like rapidity, the Magpie sheering off in its dash, and just getting clear of the sharp claws aimed at it. The whole performance can be seen very plainly, owing to the length of leg possessed by this genus."

D'Ombrain (*Emu*, Vol. IV., p. 125, 1905) noted in Victoria: "Very plentiful, often breeding in the middle of a crop. Commence breeding in September. Clutch generally three, occasionally five. In season 1899 five eggs were taken by myself from a large isolated clump of rushes in a swamp. The young are most vicious. They will eat anything. Of two I had last season, the female killed her brother and gorged herself with his body. They have regular 'stand-up' fights, striking out fiercely with their sharp talons."

Berney observed that in North Queensland (*Emu*, Vol. V., p. 15, 1905) it was "much less frequently seen than its spotted relative, and always about bulrush beds."

Miss Fletcher, from Tasmania, gave the following note (*Emu*, Vol. VIII., p. 80, 1908): "Circling over the swamps and the adjacent bracken-covered slopes are always to be seen pairs of the Swamp-Harrier (*Circus gouldi*). The children about call these birds 'Free-wheelers,' which is indeed a descriptive name. These Harriers nest in this district. Five eggs were found in a nest last November, and the season before nine eggs were reported as occurring in a nest. I fancy in this case that the eggs of a previous clutch must have proved infertile, and the birds had rebuilt over them."

In the next volume Miss Fletcher added a most interesting account (p. 80, 1909): "The Harrier, being a frequenter of both lagoons and wooded rises, forms an appropriate bridge between the swamp and land birds. Until studying these birds here I had no idea they were so aggressive and such unfortunate neighbours for the smaller birds to have. Owing to many of the smaller lagoons drying up, these predatory birds were confined to the larger sheets of water and adjacent scrubby rises, consequently many fierce battles were waged. One evening I watched one of these Harriers endeavouring to catch a Ground-Lark (*Anthus australis*). Afraid of losing his prey, the pursuer called to his mate, who quickly appeared, and together they dashed after the Lark. This poor little creature rose higher and higher, endeavouring to escape its persecutors, and its cries of distress could plainly be heard, even when it was so high up that it appeared but a speck. It eventually got away by flying against the wind, in which direction it seemed to quickly gain upon the Hawks. These latter were greatly disconcerted at the loss of their quarry. They circled round and round, up and down, calling to one another, and were apparently completely nonplussed at their failure. These Harriers appear to have regular feeding-places, or 'tables,' and when food is captured retire to them to devour it. Sometimes the 'tables' are a bunch of trodden-down reeds, ofttimes an old nest. That meals are plentiful, the Coots' feathers and claws, rabbit skins and bones of smaller creatures amply testify. The nests I found last season were all built in reed tussocks, generally close to water, sometimes in clumps standing in 2 to 3 feet of water. Sticks and bark formed the foundation, with grassy lining. The nest is easily found, the sitting bird betraying the situation as she rises very suddenly when the intruder is heard approaching. One bird I often flushed was a magnificent specimen of her species, large framed and beautifully marked. She was sitting on three eggs, very small and dainty, white with dark green lining. I took them on 23rd November and placed two pullet eggs (white and pierced) in their place, as an experiment, to see what the Hawk would do, also how long she would continue to sit. As soon as I was apparently out of sight she returned to her nest, and had such faith in the eggs that she continued sitting for some weeks. The Christmas holidays intervened, and when I looked at the nest early in February there were no traces of shells. Probably the eggs were eaten by Crows after the Hawk's desertion. An interesting fact in connection with this bird was that close at hand was a second Hawk's nest, from which at sundown I sometimes flushed a Harrier, but in it eggs were never laid: so I came to the conclusion that the bird which was off duty slept on this spare nest. I have known these Harriers to desert a partly-made nest because it had been inspected. All local birds look on these Hawks as enemies: even the Rosella Parrots (*Platycercus eximius*) chase them. Last season I watched a pair of *Circus gouldi* attack a White Cockatoo (*Cacatua galerita*) as it flew across a lagoon. One Hawk struck it, but it got away, uttering most discordant shrieks, and leaving a clawful of white feathers behind."

North, in the *Austr. Mus. Spec. Cat.*, no. 1, Vol. III., pp. 179-183, 1911, records a great deal about the nesting, nest and eggs of this species, and from that source I extract the following interesting note of its habits by Mr. K. H. Bennett: "Although by no means numerous, *Circus gouldi* may be met with in this locality (Booligal, New South Wales) all the year round, but only where there are swamps affording shelter for waterfowl, which, with their young, constitute a portion of its food. It is much fiercer and more rapacious than *Circus assimilis*, and does not hesitate to attack birds of larger size, such as Ducks, Waterhens and Coots. It has a curious habit in the mode of descent from an immense height above a swamp or reed-bed, and in uttering shrill screams while so engaged. Usually the first indication of the presence of this Harrier is its wild and piercing note, and on looking up the observer sees the bird high up in the air performing the most extraordinary evolutions, tumbling head downwards for a long distance as if wounded, then suddenly shooting upwards for a little way, which is repeated several times, but gradually getting nearer all the time to the surface of the swamp, when this erratic flight ceases, and it perches either on the top of the reeds or some branch projecting above them. Here the bird rests for some time, then commences its quest for prey by flying slowly and stealthily just above the tops of the reeds or rushes, carefully scrutinising each small patch of open water or the swamp. On one occasion I saw one pounce on a Black Duck (*Anas superciliosa*) in some open water amongst the reeds. The unfortunate Duck at once dived, but the Harrier, expanding its broad wings, effectually prevented the Duck from drawing the former under the water, and it could only swim about at a certain depth until it was drowned. When this was accomplished the Harrier, by gently flapping its wings, steered the prey to a small partly submerged log, and then letting go the dead Duck rose to the surface. Stretching out one of its long legs, he soon had it on the log, and commenced to eat it, but as the fun was now over I determined to have the Duck, which I quickly confiscated."

There appear to be no notes of this bird from the North-west of Australia, which would belong to the race *C. a. inexpectatus*: all the preceding notes are referable to the race *C. a. gouldi*.

The racial forms of this bird are not easily determinable. As noted above, when Gurney revived Peale's name he contended his *C. wolfi* was a distinct species. At most it can only be considered as a subspecies, and I find Sarasin in *Die Vögel Neu-Caledoniens* 1913, p. 5, has so classed it. That worker, however, unfamiliar with systematic ornithological work and literature, has called the New Caledonian bird *Circus gouldi wolfi* and given as distribution of his forms the ranges:

"*Circus gouldi* typ.: South and East Australia, New Zealand, Fiji.

"*Circus gouldi wolfi*: New Caledonia, New Hebrides and Lord Howe's Island."

The species name must be *approximans* and the Fijian form must bear that name, and therefore Sarasin's *C. gouldi* typ. would become *C. approximans* typ.; but if the Fiji and East Australian birds were inseparable the New Hebrides one could scarcely bear a different name. I do not understand the reference of the Lord Howe Islands bird to *Circus gouldi wolfi*.

The nomination of the forms would read:

Circus approximans approximans Peale: Fiji Islands.
Circus approximans wolfi Gurney: New Caledonia, New Hebrides.

ALLIED HARRIER (SWAMP-HAWK).

Circus approximans drummondi Mathews and Iredale: New Zealand.

Circus approximans gouldi Bonaparte: Queensland; East, South and South-west Australia.

Circus approximans inexpectatus Mathews: North-west Australia and Northern Territory.

GENUS—LEUCOSPIZA.

LEUCOSPIZA Kaup, Classif. Saugeth. u Vögel, p. 119, 1844 .. .. Type *L. novæhollandiæ.*

Also spelt—

Leucospizia Kaup, Archiv. fur Naturg., 1850, p. 36.
Leucospizias Sundevall, Meth. Nat. Av. Disp. Tent., p. 107 note, 1872.

SMALL Aquiline birds with short bills, short wings, long tail and medium legs.

The bill is short, very hooked, tip very sharp and narrow: at the base the bill is deep and broad with a large cere; the nostrils are small oval apertures, semi-operculate, placed in the upper part of culmen parallel to the culmen ridge: the loreal bristles reach but do not envelop the nasal openings. The lower edges of the upper mandibles more or less strongly sinuated, but not toothed. Under mandible rather flat and shallow.

The wings are comparatively short and somewhat rounded, the first five quills emarginate on both vanes. The first primary is very short, the fourth and fifth subequal and longest, the third longer than the sixth, the second subequal with the seventh: the first not much more than half the length of the fourth.

The tail of twelve feathers is long, slightly rounded and about two-thirds the length of the wing.

The legs in their main features agree with those of *Circus,* but they are not quite so long: the tarsus is less than half the length of the tail but more than a quarter that of the wing.

The middle toe is about two-thirds the length of the tarsus: the claws are very large and strong, the hind claw especially so, being longer than the inner claw which is much longer than the other two.

Key to the Species.

Pure white all over	*L. novæhollandiæ,*	p. 43.
Grey above, white below	*L. cinerea,*	p. 36.

No. 293.

LEUCOSPIZA CINEREA.

GREY GOSHAWK.

(Plate 236.)*

Sparvius cinereus Vieillot, Nouv. Dict. d'Hist. Nat.,Vol. X., p. 338, 1817 : New South Wales.

Sparvius cinereus Vieillot, Nouv. Dict. d'Hist. Nat., Vol. X., p. 338, 1817.

Astur raii Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 180, 1827 : New South Wales.

Falco raii Lesson, Traité d'Orn., p. 67, 1830.

Astur rayi Bonaparte, Consp. Gen. Av., Vol. I., p. 31, 1850 ; Gray, Handl. Gen. Sp. Birds, pt. i., p. 30, 1869.

Leucospiza raii Gould, Handb. Birds Austr., Vol. I., p. 37, 1865.

Astur cinereus Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 117, 1874 ; Ramsay, Cat. Austr. Acc., p. 9, 1876 ; *id.*, Proc. Linn. Soc., N.S.W., Vol. II., p. 177, 1878 ; *id.*, Tab. List Austr. Birds, p. 1, 1888 ; North, Austr. Mus. Cat., no. 12, p. 2, 1890 ; *id.*, *ib.*, no. 4, p. 6, 1898 ; Hall, Key Birds Austr., p. 4, 1899 ; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 4, 1901 ; Hall, Key Birds Austr., 2nd ed., p. 4, 1906 ; Le Souëf, Emu, Vol. VII., p. 187, 1908 (Vict.) ; Howe and Tregellas, *ib.*, Vol. XIV., p. 81, 1914 (Vict.).

Leucospiza novæhollandiæ Ramsay, Proc. Zool. Soc. (Lond.) 1875, p. 579 (Queensland).

Astur clarus (not Latham) Sharpe, Hist. Coll. Nat. Hist. B. M., Vol. II., p. 112, 1906; Mathews, Handl. Birds Austral., p. 39, 1908 ; Howe, Emu, Vol. IX., p. 229, 1910 (Vict.) ; North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 184, 1911.

Astur clarus clarus Mathews, Nov. Zool., Vol. XVIII., p. 245, 1912.

Astur clarus cooktowni Mathews, *ib.* : Cooktown, North Queensland ; *id.*, South Austr. Ornith., Vol. II., p. 19, 1915.

Leucospiza clara clara Mathews, List Birds Austr., p. 102, 1913.

Leucospiza clara cooktowni Mathews, *ib.*, p. 103, 1913.

Astur clarus robustus Zietz, South Austr. Ornithologist, Vol. I., p. 13, 1914 : Melville Island (N.T.).

Leucospiza clara robusta Mathews, Austral Av. Rec., Vol. II., p. 90, 1914.

Distribution. Victoria ; New South Wales ; Queensland. Melville Island, Northern Territory.

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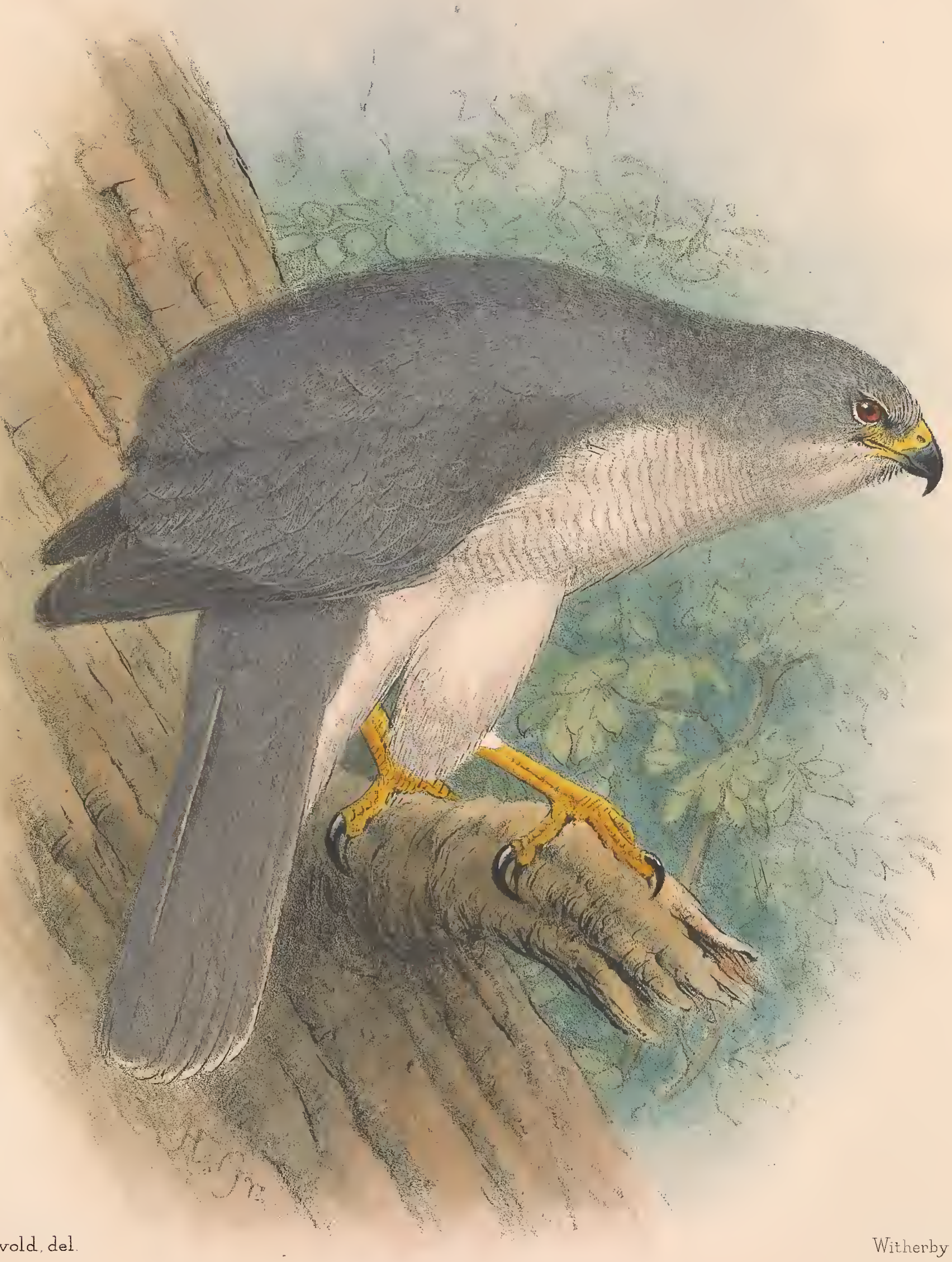
* The Plate is lettered *Astur clarus*.



H. Grönvold, del.

Witherby & C°

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ASTUR CLARUS.

(GREY GOSHAWK).

GREY GOSHAWK.

Adult female. Uniform ash-grey above including the head, hind-neck, sides of neck, entire back, scapulars and wings; tail crossed by eleven dark bands, the feathers being somewhat brown at the tips; quills slightly darker than the back, being white on the basal portion of the inner webs which are crossed by dark bars; throat and entire under-surface mottled and barred with grey; thighs, lower abdomen, under tail-coverts and under wing-coverts pure white; axillaries white, narrowly barred with grey. Bill black, cere yellow; iris bright chestnut-red; tarsi and feet dark yellow. Total length 560 mm.; culmen 33, wing 286, tail 225, tarsus 81. Figured. Collected at Atherton, near Cairns, North Queensland, in September, 1908.

Adult male. Uniform pale ash-grey above; quills slightly darker than the back, the inner webs almost pure white; tail uniform with faint dark barrings on some of the feathers; under-surface, including axillaries, pure white with only a little very pale grey barring on the chest. Total length 425 mm.; culmen 29, wing 261, tail 200, tarsus 68. Collected at Cooktown, North Queensland, on the 13th of May, 1900, and wrongly sexed a female, and is the type of *A. c. cooktowni.*

The birds from South Queensland, New South Wales and Victoria are slightly larger, lighter and with the markings on the breast not so pronounced as those from Northern Australia.

A female from the Richmond River, New South Wales, measures: wing 311 mm., tarsus 84. A male from Kangaroo Valley, New South Wales, measures: wing 264 mm., tarsus 71. Collected June, 1891.

Nestling stages probably as given by Gould below.

Immature. "Young birds are pale ashy-brown above, the white bases of the feathers showing here and there, but particularly on the lower portion of the hind-neck, where some of the feathers are entirely white, with the exception of one or two V-shaped pale ashy-brown cross-bars; wings and tail-feathers pale brown with a slight greyish wash, the latter having brownish-white tips, with eight or more distinct dark brown cross-bars; crown of the head dull grey-brown: all the under-surface dull white, with broad ⌒⌒ shaped ashy-brown crossbars on the breast. From this stage of plumage on to maturity the upper-parts become greyer and the dark brown cross-bars are almost entirely obsolete: the last sign of immaturity is usually exhibited in the broader and darker ashy-brown bars on the breast." (North.)

Nest. Placed high up in a tree; a bulky platform of sticks and lined with leaves.

Eggs. Clutch two; bluish-white (faintly noticeable), sometimes with a few markings of brown. Axis 52-53 mm., diameter 38-41.

Breeding-season. August to December.

The complicated history of this bird and the next will be treated under the latter. Here I will only deal with the names proper to this species alone.

In 1827 it was described by Vigors and Horsfield under the name *Astur raii,* and when Gould recognised it in his *Handbook* (1865) he called it *Leucospiza raii.*

In the "Birds of Australia" (1848) Gould did not separate these two, this and the next species, but referred to both under the name *Astur novæhollandiæ.*

In 1874, in the *Catalogue of the Birds in the British Museum*, Vol. I., p. 117, Sharpe admitted this species but revived for it the name given by Vieillot in 1817, which had been overlooked, viz. *Sparvius cinereus*. As *Astur cinereus* this bird was then known until 1906, when Sharpe, dealing with the Watling Drawings in the *Hist. Coll. Nat. Hist. Brit. Mus.*, Vol. II., p. 112, wrote:

"Nos. 14, 15. Fair Falcon, Lath., *Gen. Syn. Suppl.*, II., p. 54.
Falco clarus Lath., *Ind. Orn. Suppl.*, p. xiii."

These two figures seem to be undoubtedly intended for *Astur cinereus* (*cf.* Sharpe, *Cat. Birds*, I., p. 117), though in the "Catalogue" I referred Latham's "Fair Falcon" to *A. novæhollandiæ*. This must be a mistake, but the figures are by no means a good representation of *A. cinereus*, over which Latham's name will take precedence, and the species must be called *Astur clarus* (Lath.)." Sharpe's correction was accepted by me in my "Handlist" 1908 and has been used by me ever since.

Upon careful reconsideration of Latham's description and examination of the Watling Drawings I now advise the rejection of Latham's name and reversion to the now well-known specific name of *cinerea*.

Latham's description of *F*(*alco*) *clarus, Index Ornith. Suppl.*, II., p. xiii., reads:

"F. fuscus, capite and corpore subtus albo, vertice and abdomine medio cærulescentibus.

"Fair Falcon, *Gen. Syn. Suppl.*, II., p. 54, No. 66.

"Habitat in *Nova Hollandia*; rostrum fuscescens; *irides* and *pedes* flavi: variat *nucha* nigro maculata, *uropygio* cærulescente, *cauda* apice pallida."

No size is here given, and this is simply a rough Latin translation of the account of the "Fair F(alcon)" which reads:

"The length of this species is about twelve inches; the bill is pale brown; legs and irides yellow; head, neck before, and all beneath, white; the crown of the head and middle of the belly pale blue; back, wings, and tail brown; the bend of the wing brownish-blue, occupying in an oblique manner above half the coverts.

"Inhabits *New Holland*, but neither name nor manners are recorded. Another, very similar, was spotted on the nape with black; the back paler; rump pale dusky blue; tail tipped with pale colour; all beneath white, but not tinged anywhere with blue."

These descriptions are drawn up from the Watling Drawings, and examination of No. 14 shows it to be the basis of the principal portion. This figure has marked on it: "Half the natural size," and measures 130 mm. in length. Though not mentioned in the description, there are mottlings of darker colour on the crown of head; the throat is mottled and the breast has longitudinal dark streaks, and obscure cross-bars are seen on rest of under-surface; the primaries and tail are uniformly glossy brown with white spots at tip of tail.

Fig. 15 has provided the second description. Again the figure is marked "Half the natural size," but the drawing measures only 106 mm.

The two drawings were certainly made by different artists, and I conclude from different birds: they do not appear conspecific to me.

However, the first is the one upon which the name *Falco clarus* depends, and the size, if correctly stated, negatives its association with the present species. This conclusion is confirmed by the *blue* colouring of the head and bend of the wing and the uniform tail, as well as the colouring of the wings and tail.

It *may* have been drawn from an immature specimen of this bird, but if so the coloration and size are both wrong. Consequently it is inadmissible. As a matter of fact it might just as well have been drawn from an immature of *Accipiter cirrhocephalus,* when the size would be correct, but not the colouring. I therefore have no hesitation in counselling the rejection of the name and the acceptance of Vieillot's name of *cinereus.*

When Sharpe worked through the Watling Drawings he was prejudiced by the idea that they must represent living Australian birds, and until quite recently I was under the same impression. The discovery of the painting of the extinct Lord Howe Island Pigeon, as detailed in the *Austral Avian Record,* Vol. III., pp. 21-24, 1915, has caused me to seriously reconsider these drawings, and it is certainly possible that some of the ones yet unrecognised may represent extinct forms. Under these new circumstances the rejection of drawings not *accurately* figuring a known form is demanded, and I will work to these new conditions for the future.

I have received no notes concerning this bird's economy, so reproduce what has been published by others. Thus Gould wrote: "The only part of Australia in which I met with this species was New South Wales, where it would appear to evince a preference for the dense and luxuriant brushes near the coast: but so little has at present been ascertained respecting its economy, range and habits, that its history is nearly a blank; even whether it is migratory or not is unknown. That it breeds in the brushes of the district above mentioned is certain, for I recollect seeing a brood of young ones in the possession of Alexander Walker Scott, Esq., of Newcastle, on the Hunter, a gentleman much attached to the study of the natural productions of Australia. These young birds differed but little in colour from the fully adult specimens in my collection, except that the transverse markings of the breast were darker and of a more arrow-shaped form, which markings become fainter and more linear as the bird advances in age. The sexes present the usual difference in size, but in colour and markings they closely assimilate."

North, in the *Austr. Mus. Spec. Cat.*, no. 1, Vol. III., 1911, pp. 184-186, gives a couple of notes only regarding the nidification of this bird; from this work I have noted the following:

"This bird is essentially an inhabitant of the coastal districts, the contiguous scrubs and heavily timbered mountain ranges, but is sometimes found in open forest lands. Stomachs of specimens examined contained the remains of small birds and mammals, also lizards and various kinds of insects.

"Mr. G. Savidge's notes about the nesting include: '*Astur cinereus* is fairly plentifully dispersed in the thick scrub lands in the Upper Clarence River District, and its call is very much like that of the "King Parrot." . . . The young birds examined were like their parents, white and grey. . . . The parent birds do not go away while being robbed, but fly about from tree to tree. . . . Mr. E. H. Lane and my son visited this nest in 1905, when it contained young. It has been used, to my knowledge, every season for many years.' "

Mr. H. Barnard's notes regarding this and the next species will be given under the latter, but Dr. Macgillivray's notes from the *Emu*, Vol. XIII., p. 149, 1914, may be here reproduced.

"*Astur cinereus*: Grey Goshawk. *Astur novæhollandiæ*; White Goshawk. Mr. M'Lennan agrees with Mr. Harry Barnard in regarding the Grey and the White Goshawks as phases of one species. He found it, however, very difficult to gain information as to the mating of birds of two colours, and the resultant effect on the young. Like *Astur fasciatus*, the male bird is rarely seen anywhere near the nest. Many hours were spent waiting and watching for the appearance of the male bird, and, although fourteen nests containing either young or eggs came under observation, the male was seen only once. Eight of the females were grey birds, and six white. Where the male and female were seen both were grey. Only one nest contained a young bird: it was nearly fully fledged, and was grey, the parent being also grey.

"These birds began to build or repair old nests early in August, but no eggs were laid until October, the earliest record being on the 5th of that month. Nesting finished at the end of November, the only two records in December being of hard-set eggs or fully fledged young. One autumn nest was found to contain eggs on the 17th April. Most of the nests were placed in a horizontal fork of a Moreton Bay ash, this tree being resorted to in the case of twelve out of the fourteen records, the other two being in *Melaleucas*: the average height at which they were placed was 60 feet. Many of the nests, well out on horizontal limbs, could only be reached by means of a scoop on a long rod. I cannot do better than quote Mr. M'Lennan's note to illustrate some of the difficulties a climber has to contend with who seeks to investigate the nesting of this bird: 'In a pocket off Peak Point track I found a White Goshawk's nest 60 feet up in a big Moreton Bay ash: it contained two hard-set eggs. I had a terrible time climbing this tree. It was a hard tree to climb, and when I got 30 feet up I struck myriads of small yellow ants; they got all over me—in my eyes, ears and nose—and bit savagely, so that you can imagine what it was to go the other 30 feet and back again before getting any relief. One nest was placed in a tree in which a colony of *Calornis* had nested. During the nesting-season of the Goshawk the adult young of the *Calornis* form their principal article of food, and it is probable that the nesting of the Hawk is timed to that of this Starling.' "

It will be noted from this account that there is an opinion that the present and the next species are the same; this will be more fully dealt with under the next, but it may be here noted that this bird has a more restricted range than its supposed albinistic offshoot. While with our present state of knowledge it would be foolish to deny such a relationship, if it were proved it would become one of the most interesting cases in the ornithological world. For the "albinistic" seems to have proved a stronger form than the original, whereas albinism is generally due to some physical weakness.

This species ranges from Victoria to Cape York, and I separated the northern form as being slightly smaller; this would be in accordance with its range, as its main headquarters appear to be New South Wales. Recently, however, Zietz recorded it from Melville Island, Northern Territory, and separated that form as more robust. We may tentatively admit three forms, but longer series are necessary to define them accurately. I am quite convinced that the variation in this Order necessitates long series, and that even then the definition of subspecies must be more or less arbitrary.

By this conclusion I do not mean that subspecific forms have not become differentiated, but that the variation and plumage-changes with the material available mask these forms, and we have not been able to grasp the points wherein they show their subspecific characters. The occurrence of this bird on Melville Island suggests its recognition in the area intervening between that island and Queensland, but it does not appear to have yet been noted.

If it be absent, another problem would be added to the already complex one surrounding this bird.

The forms that might be admitted would bear the names:

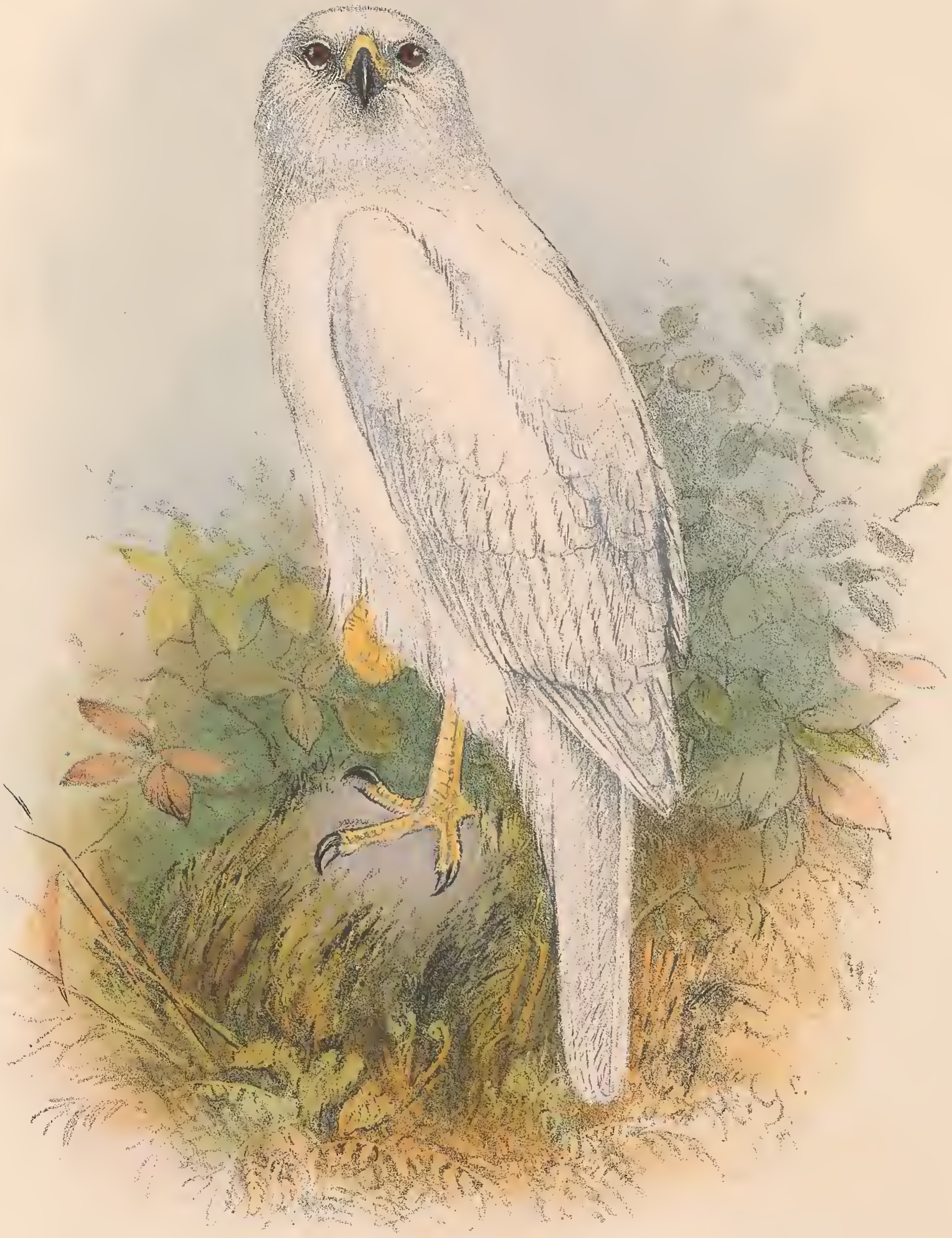
Leucospiza cinerea cinerea Vieillot: Victoria; New South Wales; South Queensland.

Leucospiza cinerea cooktowni Mathews: North Queensland.

Leucospiza cinerea robusta Zietz: Melville Island, Northern Territory.

The last two are not well defined, but on geographical grounds should be maintained until more material is received and the status fixed. It is a decided aid to workers to maintain as distinct, doubtful subspecies rather than sink them as synonyms; their maintenance fixes them as sign-posts and guides to workers and obviates errors of duplicate nomination such as have commonly occurred in the past through their reduction to synonyms, and consequent non-consideration by even careful workers.

The bird figured is a male, collected at Gracemere, Queensland, on the 25th of February, 1881.



H. Grönvold. del

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ASTUR NOVÆ HOLLANDIÆ.

(WHITE GOSHAWK).

No. 294.

LEUCOSPIZA NOVÆHOLLANDIÆ.

WHITE GOSHAWK.

(Plate 237.)*

Falco novæhollandiæ Gmelin, Syst. Nat., p. 264, 1788 : Tasmania.

New Holland White E(agle) Latham, Gen. Synops. Birds, Vol. I., p. 40, 1781.

Falco novæhollandiæ Gmelin, Syst. Nat., p. 264, 1788 (Tasmania) ; Latham, Index Orn., Vol. I., p. 16, 1790.

Falco albus (not Gmelin) White, Journ. Voy. N.S.W., p. 250, pl. 35, 1790 (N.S.W.).

Sparvius niveus Vieillot, Nouv. Dict. d'Hist. Nat., Vol. X., p. 338, 1817 : Tasmania.

Lacteous Eagle Latham, Gen. Hist. Birds, Vol. I., p. 216, 1821.

Astur novæhollandiæ Vigors, Zool. Journ., Vol. I., p. 338, 1824 ; Gould, Synops. Birds Austr., pt. iii., pl. 44, 1838 ; Gray, Genera Birds, Vol. I., p. 27, 1845 ; Gould, Birds Austr., Vol. I., pl. 15, 1848 ; Bonaparte, Consp. Gen. Av., Vol. I., p. 31, 1850 ; Diggles, Orn. Austr., pt. xv., pl. ix., 1867 ; Gray, Handl. Gen. Sp. Birds, pt. i., p. 29, 1869 ; Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 118, 1874 ; Ramsay, Cat. Austr. Acc., p. 11, 1876 ; *id.*, Proc. Linn. Soc., N.S.W., Vol. II., p. 177, 1878 ; Legge, Papers and Proc. Roy. Soc. Tasm. 1886, p. 237, 1887 (Tasm.) ; Ramsay, Tab. List Austr. Birds, p. 1, 1888 (Q.) ; Broadbent, Proc. Roy. Soc. (Queens.), Vol. V., p. 15, 1889 ; Cox and Hamilton, Proc. Linn. Soc. N.S.W., 2nd Ser., Vol. IV., p. 397, 1890 (N.S.W.) ; North, Austr. Mus. Cat., no. 4, p. 9, 1898 ; Hall, Key Birds Austr., p. 4, 1899 ; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 4, 1901 ; Hill, Emu, Vol. II., p. 161, 1903 (Vict.) ; Hartert, Nov. Zool., Vol. XII., p. 207, 1905 (N.T.) ; Batey, Emu, Vol. VII., p. 3, 1907 (Vict.) ; Mathews, Handl. Birds Austral., p. 40, 1908 ; *id.*, Emu, Vol. IX., p. 5, 1909 (N.W.A.) ; Ingle, *ib.*, Vol. X., p. 121, 1910 (Vict.) ; Littler, Handb. Birds Tasm., p. 2, 1910 (Tasm.) ; North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 187, 1911 ; Barnard, Emu, Vol. XI., p. 20, 1911 (N.Q.).

Astur albus Jardine and Selby, Illus. Orn., Ser. 1, pl. 1, p. 1, 1826.

Dædalion candidum Lesson, Traite d'Orn., p. 66, 1830 (N.S.W.)

Falco leucaëtos Forster, Descr. Anim. ed. Licht., p. 70, 1844 (Tasm.).

Leucospizia novæhollandiæ Bonaparte, Rev. Mag. Zool., 1854, p. 537 ; Gould, Handb. Birds Austr., Vol. I., p. 38, 1865 ; Masters, Proc. Linn. Soc. N.S.W., Vol. I., p. 45, 1876 (N.Q.).

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* The Plate is lettered *Astur novæhollandiæ.*

Leucospizias novæhollandiæ Gurney, List Diurn. Birds of Prey, p. 33, 1884.

Astur novæhollandiæ subsp. *leucosomus* (not Sharpe) Ramsay, Cat. Austr. Acc., p. 12, 1876 (N.Q.); *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 177, 1878 (N.Q.); *id.*, Tab. List Austr. Birds, p. 1, 1888 (N.Q.); Hall, Key Birds Austr., p. 4, 1899 (N.Q.); Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 6, 1901 (N.Q.); Le Souëf, Emu, Vol. II., p. 85, 1902 (N.T.).

Astur leucosomus (not Sharpe) North, Austr. Mus. Cat., no. 4, p. 11, 1898; Mathews, Handl. Birds Austral., p. 40, 1908.

Astur novæhollandiæ novæhollandiæ Mathews, Nov. Zool., Vol. XVIII., p. 245, 1912.

Astur novæhollandiæ alboides Mathews, Nov. Zool., Vol. XVIII., p. 246, 1912: Parry's Creek, North-west Australia; *id.*, South Austr. Ornith., Vol. II., pt. I., p. 19, 1915 (Q.).

Astur novæhollandiæ leucosomus Mathews, *ib.* (N.Q.).

Leucospiza novæhollandiæ novæhollandiæ Mathews, List Birds Austr., p. 103, 1913; *id.*, Ibis 1914, p. 108 (N.T.).

Leucospiza novæhollandiæ leucosoma Mathews, List Birds Austr., p. 103, 1913 (N.Q.?); *id.*, Austral Av. Rec., Vol. II., p. 106, 1914.

DISTRIBUTION. South Australia; Tasmania; Victoria; New South Wales; Queensland. Melville Island; Northern Territory, North-west Australia.

Adult female. Entire plumage, both above and below, uniform pure white; bill black, cere and corner of mouth yellow; iris red; tarsi and feet pale yellow. Total length 580 mm.; culmen 30, wing 300, tail 240, tarsus 80. Figured. Collected on Melville Island, Northern Territory, on the 16th of June, 1912, by Mr. J. P. Rogers.

Adult male. Similar to the adult female but smaller. Total length 450 mm.; culmen 27, wing 258, tail 200, tarsus 73. Collected on Parry's Creek, North-west Australia, on the 8th of October, 1908, by Mr. J. P. Rogers, and is the type of *Leucospiza novæhollandiæ alboides.*

Immature. "Pure white." (G. Savidge.)

Birds from North-west Australia, Northern Territory and North Queensland are on the whole generally smaller (*alboides*). The birds from the rest of Australia and Tasmania are *novæhollandiæ.*

Leucospiza novæhollandiæ leucosomus (Sharpe) does not occur in Australia. Wing 198 mm.

Nest. A bulky structure of sticks.

Eggs. Clutch two; similar to those of *L. clara.*

Breeding-season. August to December.

IT must be obvious that such a striking bird would claim attention from even the most casual observer, and consequently the first voyageur to touch Australia who saw so strange a novelty would record the fact.

Consequently, when Furneaux touched at Tasmania, when the "Adventure" under his command became separated from the vessel under Captain Cook's own supervision, a specimen of this bird was secured. When

Furneaux arrived at New Zealand and joined up with Captain Cook, a *résumé* of his experiences was detailed to the latter. These were published in *Cook's Voyage*, Vol. I., p. 112, where it is noted: "I forgot to mention a large white bird that one of the gentlemen shot, about the size of a large kite of the eagle kind."

George Forster also prepared an account of the "Voyage," and in his book *Voyage Round the World* 1777, p. 196, stated: "The 'Adventure' lay only three days in this bay (Frederick Henry Bay, Tasmania), during which Captain Furneaux took in a small quantity of fresh water and collected several curious animals . . . and a fine white hawk." George Forster made a painting of this specimen, which has probably long since decayed; in this case it must have been preserved, as J. R. Forster drew up a detailed description in addition to George's painting: this description was not published until 1844; the painting, however, is still preserved in the British Museum (Natural History) as recorded by Sharpe (*Hist. Coll. Nat. Hist. Brit. Mus.*, Vol. II., p. 180, 1906). The name *Falco leucoaëtos* Forster is a synonym of *Falco novæhollandiæ* Gmelin, founded on Forster's account only of this bird, as follows.

In the *General Synopsis of Birds*, Vol. I., 1781, p. 40, Latham described: "New Holland White E(agle) N.S. Length twenty inches. Orbits of the eyes yellow: cere the same; the whole body of a pure white; the legs are yellow: the hind claw double the length of the others. Inhabits *New Holland*. Communicated by Dr. G. R. Forster. I am much obliged by many hints and observations communicated to me by that gentleman in the course of his voyage round the world."

Gmelin (*Syst. Nat.*, p. 264, 1788) gave the Latin name *Falco novæhollandiæ* to this description, and this name was accepted by Latham in the *Index Orn.*, Vol. I., p. 16, 1790.

Almost simultaneously was published in the *Journal Voyage New South Wales* by White, p. 250, a description of "The White Hawk: *Falco albus*" and this was accompanied by a coloured figure, which appears to be the first published figure of this bird. White's account admits Shaw's aid when doing the birds and his note is worth reproduction: "This species, in shape and general appearance, seems very nearly allied to the bird called, in England, the Hen-Harrier, which is the *Falco cyaneus* of Linnæus. It is very nearly of the same size, and the legs and thighs are of a slender form, as in that species."

A painting appears among the Watling Drawings (No. 20) as recorded by Sharpe (*Hist. Coll. Nat. Hist. Brit. Mus.*, Vol. II., p. 112, 1906) as follows: "No. 20. Lacteous Eagle, Latham [M.S.]; *Gen. Hist. Birds*, I., p. 216,

1821. This is evidently *Astur novæhollandiæ* (Gm.) founded on the New Holland White Eagle of Latham's *Gen. Synopsis*, Vol. I., p. 40 (1781). The latter seems to have procured the description of the bird from Dr. J. R. Forster. No specimen was in the British Museum at the time. 'Name *Goo-loo-bee*' (Watling)."

From that time onwards the bird became better known and little of note was recorded. The most intricate question has been the determination of the relationship existing between this and the preceding form, and this had better be discussed here, as it was the first described form.

Gould's account I am reproducing to show how little advancement has been made since his time.

"This species has perplexed ornithologists more, perhaps, than any other member of the Raptorial Order, the point at issue being whether it be distinct or merely an albino variety of *Astur Raii* [=*cinerea*]. I have seen both birds in a state of nature, and critically examined numerous examples after death with regard to size, admeasurement, etc., and except in colouring I found no difference whatever between the beautiful snow-white bird and the grey-backed individuals so frequently shot in the brushes of the eastern parts of Australia. Mr. Ronald C. Gunn and the Rev. T. J. Ewing, of Tasmania, however, incline to believe them distinct, and, in support of this opinion, call attention to the fact that none but white birds have been found in that island; but while I admit this to be true, I do not fail to recollect that the most lovely individual I ever shot in Tasmania had fiery-red irides; still it is only fair to state they were not pink as in albinoes, and that most frequently the irides are bright yellow; the colouring of these organs, therefore, is evidently inconstant, and not to be depended upon as a characteristic. We know little or nothing of the nidification of either of the birds; could it be ascertained that the grey-backed and the white individuals mate with each other, they should be considered as identical, but until then it will be better, perhaps, to keep them distinct. Cuvier has hazarded the opinion that the white bird is an albino variety which has become permanent, and that they have the power of perpetuating their white vesture."

North (*Austr. Mus. Spec. Cat.*, no. 1, pp. 184-189, 1911) does not discuss the matter, accepting the two birds as distinct species, but noting Savidge's record of two different birds paired.

However, simultaneously, in the *Emu*, Vol. X., p. 247, Dec. 1910, appeared the following note:

"GREY *v.* WHITE GOSHAWKS. Mr. H. L. White has received the following interesting communication from Mr. H. G. Barnard from Cape York: 'What I am about to state is perfectly authentic, and I have witnesses to prove it. This is in regard to the Hawks. In my first letter from here I stated that I hoped to prove that the three Hawks—namely, *Astur cinereus*, *A. novæhollandiæ* and *A. leucosomus*—were the same bird. At the first four nests taken the birds of two of the nests were both *grey*, as in *A. cinereus*; at the other two the birds were *pure white*; then Mr. Bert Jardine informed me of a nest where one bird was pure white and the other grey. As he was leaving for New Guinea he offered to show me the nest, which was eight miles from here, towards Somerset. I went with him and we flushed a grey bird from the nest. As it was too late for further investigations that night, I proceeded with him to Somerset, returning the following day. Next morning, getting a daybreak start (I had a tramp of 16 miles, besides shooting the birds and having a large tree to climb), I reached my destination about 9 o'clock, and flushed a *pure white* bird from the nest. This bird, which was very shy, proved to be the male. After waiting about two hours, the bird returned to the edge of the nest, where I shot it. As it lay on the nest, I was afraid the dead bird would frighten its mate on its return, so I started to climb to the nest. To the first fork was about 50 feet. I was about half-way up when the female, a *grey bird*, flew into the nest and sat beside the dead one. Quickly I made my way down the tree for my gun, and as the bird hopped off the nest on to a limb, I secured it for complete identification. I then finished the climb, and got the other bird and a set of three eggs. One of the eggs was pierced in the end by a shot, but this will only make the set more interesting, as it in no wise spoilt the egg. On my way home I found another nest, from which the female flew, and she was pure white. I waited about half an hour before climbing, as I wanted to see the male, and when he came he was grey—so in one day I got a nest with a white male and grey female and *vice versâ*. I obtained another female from a nest at which both birds were grey, and it is identical with the grey bird shot with the white male. The grey birds are undoubtedly the ones classed as *A. cinereus*, while the white are exactly like *A. novæhollandiæ*. The birds are larger than *A. approximans*, and the eggs considerably larger. As I have the skins—I regretted having to shoot these fine birds—to prove the relationship, and it may be some time before they come into your possession, I ask you, in justice to Mr. Jardine who first brought the matter under my notice, and to Bert, who found and showed me the nest from which I secured the birds, to kindly place the foregoing facts before some ornithological society.' "

In the *Emu*, Vol. XI., p. 20, July, 1911, Barnard added the following: "*Astur novæhollandiæ. Astur clarus.* In the *Emu*, Vol. X., p. 247, I drew attention to the fact that these two birds, which have hitherto been catalogued as separate species, breed together freely in the Cape York district, and I am firmly convinced that the grey and white birds belong to the same species. In all I secured 8 clutches of eggs. In three cases only were both the birds grey; in two cases they were pure white, and in each other instance the plumage of male and female differed in colour. In one instance I took a clutch of eggs from a pair of grey birds, the female being shot at the nest. The male remained in the vicinity for a week, and then mated with a white female. The pair stayed about the nest which was eventually used. I secured the eggs, which differ considerably in size and shape from the former set. I also secured the eggs of a grey female whose mate was white. The birds are plentiful in the locality, and my attention was first drawn to the mating of birds of the two varieties by Mr. F. L. Jardine, of Somerset, who for several years had noted the fact. In all instances both the grey and white birds possessed fiery blood-red eyes. I secured several skins. All the eggs obtained were of a bluish-white colour and totally devoid of markings. These birds always breed in forest country, the nest being placed high up in large *Melaleuca* trees or Moreton Bay ash (*Eucalyptus*). . . . These birds appear to gather most of their food from the scrubs, as they are frequently seen flying over the tops of the tall scrub. On several occasions I observed the male bringing to the nest the small Fruit-Pigeon (*Lamprotreron superba*). Both sexes appear to take their turn at incubating."

Mr. Barnard's experience is interesting and invaluable, but unfortunately it does not entirely dispose of the difficulties. It is now certain that the birds breed together at Cape York more or less commonly, but that does not end the matter. The grey bird is found only in East Australia from Cape York to Victoria, while the white bird is common in Tasmania, and while covering the habitat of the grey bird extends over the Northern Territory to North-west Australia, while a form, which will be later discussed, is found in New Guinea. This more extensive range of the supposed "albino" form furnishes the puzzling complication. If it be granted that the white bird has evolved as a fixed albino from the grey bird, this extended range is most interesting: as while white birds alone are found to the south, viz. Tasmania, and the north, viz. New Guinea, and to the north-west, viz. Northern Territory and North-west Australia, only in New Guinea is a fixed variation found, and that a very small bird.

It had better be recorded that Ramsay was at one time of the opinion that the different coloration was sexual, and in the *Proc. Zool. Soc.* (Lond.) 1868, p. 381, wrote: "*Astur* (♀) sp. nov. Two specimens shot, both alike. Although this bird is in many respects like what one would expect to find the young of *Astur novæhollandiæ* (alias *A. rayii*), I believe it to be a distinct species. It is true, and, I suppose, well known, that the individuals of this latter species differ greatly in size, and, as many will not admit, in the colouring of the females. As regards the last fact I have instances of grey-backed females pairing with wholly white males, and if the New South Wales birds *are* really distinct from the Tasmanian, it will be in the fact that the females of the New South Wales birds are frequently grey-backed, while the Tasmanian birds are never so."

Ramsay, further, in *Cat. Austr. Acc.* 1876, p. 10, under the name *Astur cinereus*, mentioned this belief: "Both Mr. Gould (in his *Handbook to the Birds of Australia*, Vol. I., p. 38) and Mr. R. B. Sharpe (in the *British Museum Catalogue Accipitres*, Vol. I., p. 118) describe the male of this species as being similar in plumage to the female, but smaller. I can only say that during the last ten years, having examined over fifty specimens of *A. cinereus* and *A. novæhollandiæ* from Tasmania and all parts of Australia, from Adelaide to Cape York, I have never yet met with one male in any other than a *snow white* plumage; in size they differ considerably, some males being 21 inches in length, others only 14 inches, or perhaps less." In the second edition of the same work (1898) North added a note: "I formerly shared with Dr. Ramsay the belief that the male of *Astur cinereus* was purely white, but we have now undoubted adult males of this species which cannot be distinguished from the females except by their smaller size. Moreover, a male and female shot at a nest containing eggs, near Dubbo, New South Wales, were precisely alike in colour. A male in the collection, probably a very old bird, has entirely lost the narrow transverse ashy bars on the under-surface, except on the sides of the chest."

A grey bird was secured on Melville Island, Northern Territory, and named by Zietz, as already noted, but none have yet been noted in the Northern Territory proper, nor yet in North-west Australia nor in New Guinea, whereas pure white birds have more or less commonly been found in these districts. As above noted, M'Lennan inclines to Barnard's belief, but he was unable to confirm Barnard's account. In the case he procured, both birds were alike in colour, and consequently the interbreeding is comparatively a rare occurrence.

Gould notes that the colour of the eyes varies, but it seems from records that all Northern birds have "fiery-red" irides, whereas yellow is almost entirely found in Tasmania. I will discuss the races later.

One of the first notes of the life-history of this bird is given by Flinders (Vol. I., p. 133), as follows:

"We were proceeding onward with our prize when a white eagle with fierce aspect and outstretched wing was seen bounding towards us, but stopping short, at twenty yards off, he flew up into a tree. Another bird of the same kind discovered himself by making a motion to pounce down upon us as we passed underneath, and it seemed evident that they took us for kangaroos, having probably never before seen an upright animal in the island of any other species. These birds sit watching in the trees, and should a kangaroo come out to feed in the day-time, it is seized and torn to pieces by these voracious creatures. This accounted for why so few kangaroos were seen, when traces of them were met with at every step, and for their keeping so much under thick bushes that it was impossible to shoot them."

This experience took place on Thistle's Island, west of Port Lincoln, South Australia, on Feb. 21, 1802, and is worthy of special comment. There can be little doubt that the "white eagles" were a form of the present species, but I can find no records from South Australia. Gould does not mention that locality: Campbell gives it but notes no records, while though North includes it, he refers to the Northern Territory of South Australia only in his text. Consequently, if I be right in concluding there are no recent records from South Australia, we have here an undoubted case of extermination of a bird in recent times. Save for Flinders' account we might even have denied its occurrence in South Australia. Had the bird been inconspicuous there would have been no note, and its range might have been considered as restricted as at present.

I had overlooked a note sent me by Captain White which reads: "This is a rare bird in South Australia and it is only one or two occasions I have seen it. Last season (1912) I saw a fine specimen out on the salt plains north of Port Adelaide: it was a very timid bird and kept well out of harm's way," and the same worker recorded in the *Trans. Roy. Soc. S.A.*, Vol. XXXVIII., 1914, p. 424: "Only two of these birds were seen throughout the trip (into Central Australia from Oodnadatta), but, despite my efforts, I was unable to secure either."

These notes seem to emphasize my remarks, as no one has searched South Australia so thoroughly for birds as my friend, and it is therefore certain that it is very rare as far as that territory is concerned.

There seems to be little known of its life-history and it must be regarded as one of the rarer Australian birds. North's observations (*Austr. Mus. Spec. Cat.*, no. 1, Vol. III., pp. 187-188, 1911) cover most that has been recorded: "It chiefly frequents the thickly-timbered coastal districts, but also haunts forest lands, and occurs sparingly inland. It is one of the useful members of the Accipitres, feeding largely upon insects: the contents of stomachs examined consisted principally of this kind of food. A young male shot at Bungonia, near Goulburn, New South Wales, had the stomach filled with the remains of locusts, dragon-flies and *Phasma*, sp. On the labels of a male and female sent by Mr. E. A. C. Olive from Cooktown are marked 'food: cockroaches, beetles, snakes.' When driven by hunger, however, it does not hesitate to attack birds, and will even descend into a poultry-yard to secure its prey, one being killed at Hornsby, twenty-one miles from Sydney, having a chicken in its claws. Many birds are shot owing to their conspicuous and striking pure white plumage rendering them an object of attraction, especially when placed with a background of deep umbrageous foliage."

In the same place is a note from Mr. Malcolm Harrison of Hobart, Tasmania, to the same effect: "The White Goshawk occasionally puts in an appearance here, and its conspicuous plumage of course makes it an object of pursuit to the gunner. It has, therefore, little chance of breeding. Some years ago, however, Mr. A. E. Brent obtained several sets of eggs in the neighbourhood of Mount Faulkner, and a set now in my cabinet was taken in the same locality. These eggs are longer in proportion than those of *A. approximans*, and the colouring is not so decided."

North makes no comment upon this, but it would have been only just to have added that Mr. Brent's was the first record of the nidification of this bird, and that the eggs were described by Campbell (*Vict. Nat.* 1888). It has been pointed out several times in the *Emu* that North ignored the observations of other workers in this Catalogue, and it is unjust, whether the records are believed or not, to ignore them altogether. It is a simple matter to overlook a record, as I have myself erred in this way, but not intentionally; but in the majority of cases North deliberately suppressed all reference to current Australian literature, a practice which cannot be too severely condemned.

Campbell's notes are so well known that they need not be reproduced here, while North's additional notes relate only to nesting, and it seems superfluous to continue the reproduction of these nesting-notes only, as the books are available to all interested in eggs and nesting. All notes on habits, however, I would record and extract from Mr. Savidge's account: "The White Goshawk is found sparingly dispersed in the reaches of the Upper Clarence River, but is nowhere common. . . . Upon one occasion I found a white bird and a grey-backed one paired together: I have their eggs in my cabinet. All the young ones examined by me at Cangai, Camel-back, and Newbold Station in November, 1897, were pure white. From each of these nests, after being relined, a pair of eggs were taken the following season."

I have already given Barnard's and M'Lennan's notes.

In the *Cat. Birds Brit. Mus.*, Vol. I., p. 119, 1874, Sharpe described from New Guinea a small White Goshawk as a subspecies under the name *Astur leucosomus.* In the *Cat. Austr. Acc.*, p. 12, 1876, Ramsay introduced this bird into the Australian List with a note: "This appears to be merely a very small variety of *Astur novæhollandiæ,* of which species there are specimens from Cape York now in the Australian Museum and Dobroyde collections, which differ from the one above described only a very little in size. One of these specimens will be found under *Astur novæhollandiæ* (C. 1 juv.)." This record was maintained by Ramsay in the *Tab. List Austr. Birds,* p. 1, 1888, but North, in the *Austr. Mus. Cat.*, no. 4, 1898, p. 12, wrote: "I have never seen the specimen obtained in Torres Strait, and referred to by Dr. Ramsay in the *Proceedings* of the Linnean Society of New South Wales (Vol. III., p. 248, 1879) as belonging to this species. Neither can I find in the Museum or Dobroyde Collection any *adult* specimen of White Goshawk from Cape York agreeing in size with the smaller dimensions of *A. leucosomus* from New Guinea. A young male, *A. novæhollandiæ,* from Cape York measures: total length 15 inches, wing 9.5, tail 7.4, bill 1.2, tarsus 2.6. An adult female in the Macleay Museum, from the same locality, shot by the Curator, Mr. George Masters, on the 18th of September, 1875, measures: total length 19.5 inches, wing 11.5, tail 8.8. This is only 0.7 inches smaller in wing measurement than our largest specimen from New South Wales. The smallest adult male of *A. novæhollandiæ* we have in the collection at present was obtained at Cairns, North-eastern Queensland, and has the wing and tail feathers much worn at the tips; it measures: total length 14.8 inches, wing 9.5, tail 7.6. Dr. Sharpe's measurements of the type specimen of *A. leucosomus* (an adult male) are as follows: total length 12.3 inches, wing 7.8, tail 5.9, tarsus 2.25, middle-toe 1.2." Notwithstanding this clear statement, *Astur leucosomus* was retained by Hall, Campbell, and in my "Handlist" 1908.

In the *Austr. Mus. Spec. Cat.*, no. 1, p. 189, 1911, North reproduced the above account, adding: "*Astur leucosomus* Sharpe, inhabiting New Guinea and the adjacent islands, does not occur in Australia, and was admitted into its Avifauna on too slender grounds."

In the *Nov. Zool.*, Vol. XVIII., p. 246, I still admitted it as the North Queensland form, but separated the North-western form under the name *Astur novæhollandiæ alboides* on account of its apparent smaller size.

Finally, in the *Austral Avian Record*, Vol. II., p. 106, 1914, I advocated its removal to a Hypothetical List.

I now counsel its absolute rejection, as study of New Guinea birds show their smaller size to be absolutely much less than any bird from Australia.

In confirmation of this conclusion I would quote Rothschild and Hartert, *Nov. Zool.*, Vol. XXII., p. 51, Feb. 12, 1915, who under the name *Accipiter* (*sic*) *novæhollandiæ leucosomus* Sharpe, wrote: "Though the difference in size is enormous, there is no other difference between the larger Australian white Goshawk and the smaller Papuan race. The whole plumage is snow-white; the iris and cere yellow; bill horn-black; feet yellow. Wings of males 210-212 mm., females 242-252, against 251-272 (males) and 293-308 (females) in *A. novæhollandiæ novæhollandiæ.*"

North Australian birds seem to average slightly smaller, but there appears to be very little difference between the largest female from Melville Island and the largest from Tasmania. North has noted that the largest bird from New South Wales scarcely exceeded a Cape York specimen, so that with the material available it is doubtful whether subspecies should be maintained in Australia. This is rather strange seeing that the New Guinea form is clearly separable in size.

If the grey birds were considered as a dimorphism, then the matter would need reconsideration, for, as Ramsay observed, *no* grey birds occur in Tasmania.

Mr. J. P. Rogers records an interesting fact in the economy of this bird. He noticed that when it appeared amongst small birds it caused little disturbance. On the wing it somewhat resembled a white cockatoo, and this may account for its not being recognised as an enemy.

GENUS—UROSPIZA.

UROSPIZA Kaup, Mus. Senckenb., Vol. III., p. 259, 1845 .. .. Type *U. fasciata.*

Also spelt—

Urospizia Kaup, Isis 1848, p. 772.
Uraspiza, *id.*, Proc. Zool. Soc. (Lond.) 1867, p. 175.
Urospizias Sundevall, Meth. Nat. Av. Disp. Tent., p. 107 note, 1872.

SMALL Aquiline birds with short bills, short wings, long tails, and long legs and medium-sized feet.

The genus agrees structurally very closely with the preceding, but the bill is smaller and the upper mandible has the culmen ridge less deeply curved and the cutting edges less sinuated: the cere is also smaller.

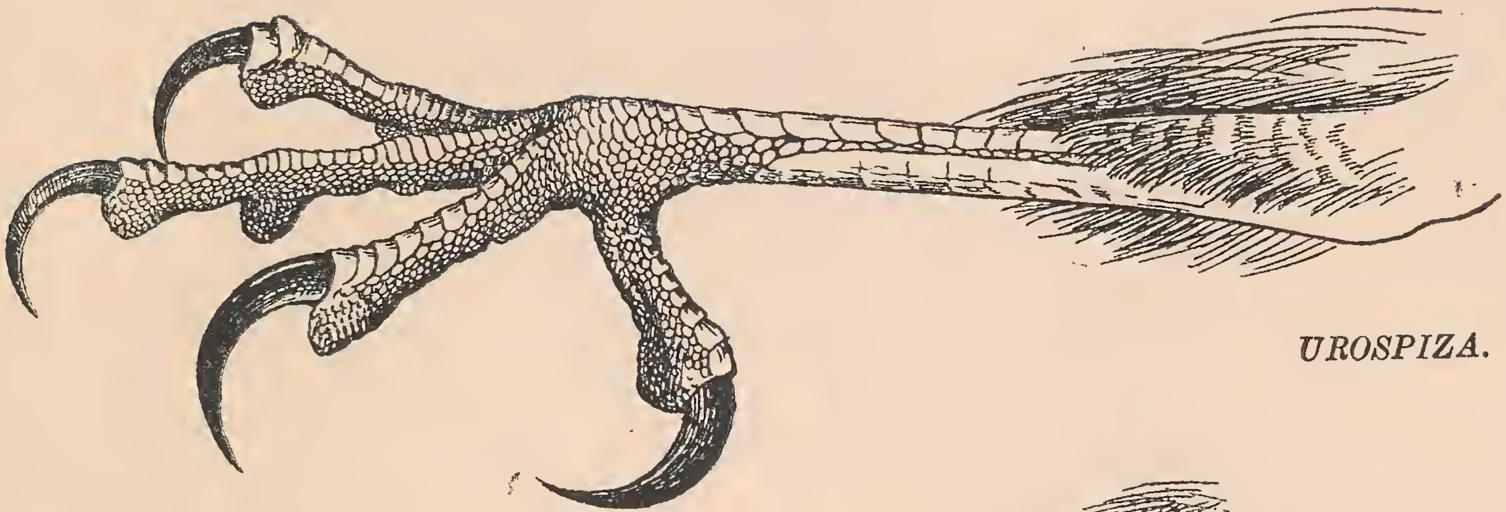
The wing has the first primary short, the third and fourth sub-equal and longest; the second longer than the sixth. The legs are longer and more slender, the feet weaker. In the adult the front of the tarsus shows an undivided plate, as does the back; but in the immature the transverse scutes of the front and the hexagonal reticulations of the back are clearly seen, fusion taking place with age.

In coloration this genus differs absolutely from the preceding, the immature contrasting vividly with the adult, whereas in *Leucospiza* the adult plumage is more or less seen in the bird as it leaves the nest.

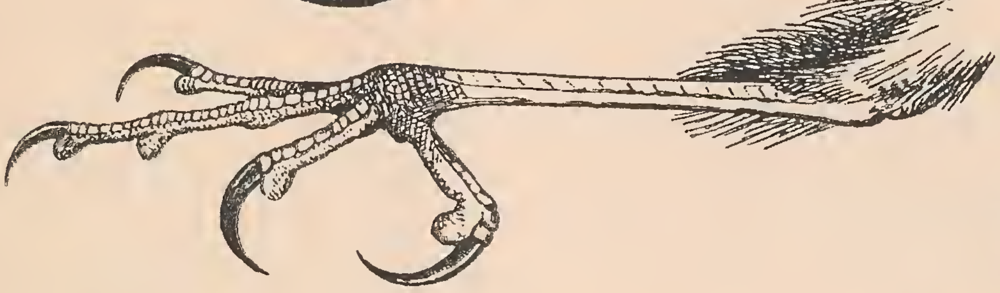
On account of its coloration this bird and its congeners have commonly been classed in *Accipiter* by authors who admit the two genera *Astur* and *Accipiter*. Other workers have usually included it in *Astur*.

Gurney first considered *Urospiza*—or as he called it *Urospizias* (more correctly)—as a subgenus under *Astur*, and then, when he had more fully studied the group, raised it to generic rank.

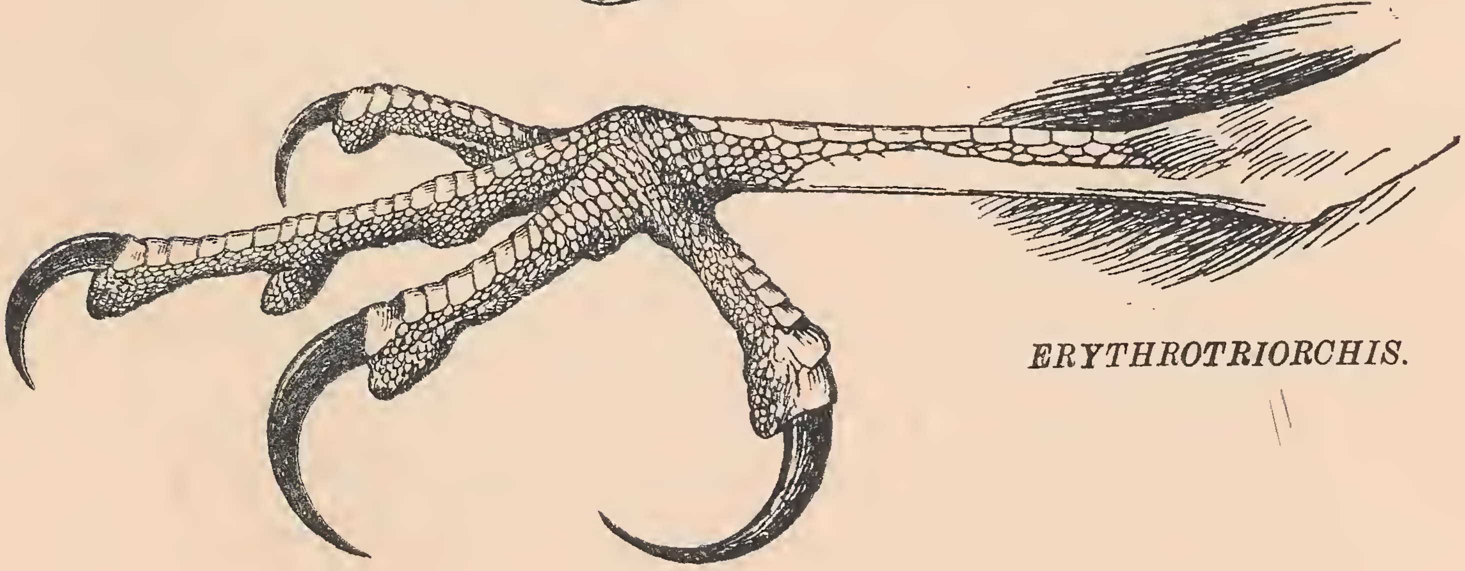
The following cut of the feet of three genera will show the generic characters.



UROSPIZA.



ACCIPITER.



ERYTHROTRIORCHIS.

No. 295.

UROSPIZA FASCIATA.

AUSTRALIAN GOSHAWK.

(Plate 238.)*

Astur fasciatus Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 181, 1827: New South Wales.

Falco radiatus (not Latham 1801) Temminck and Laugier, Plan. Color d'Ois., Vol. I., livr. 21, pl. 123, 1822.

Astur radiatus (not Latham 1801) Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 181, 1827.

Astur fasciatus Vigors and Horsfield, *ib.*: New South Wales; Hartert, Nov. Zool., Vol. XII., p. 207, 1905 (N.T.); Mathews, Handl. Birds Austral., p. 40, 1908; *id.*, Emu, Vol. IX., p. 67, 1909 (N.W.A.); *id.*, *ib.*, Vol. X., p. 107, 1910 (N.W.A.); Ogilvie-Grant, Ibis 1910, p. 170 (W.A.); Barnard, Emu, Vol. XI., p. 21, 1911 (Q.).

Astur approximans Vigors and Horsfield, *ib.* (juv.): New South Wales; Gould, Synops. Birds Austr., pt. iii., pl. 44, 1838; *id.*, Birds Austr., Vol. I., pl. 17, 1848; *id.*, Handb. Birds Austr., Vol. I., p. 41, 1865; Ramsay, Ibis 1866, p. 326 (Q.); Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 126, 1874; Ramsay, Proc. Zool. Soc. (Lond.) 1875, p. 579 (Q.); *id.*, Cat. Austr. Accip., p. 13, 1876; *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 177, 1878; Legge, Papers and Proc. Roy. Soc. Tasm., 1886, p. 237, 1887 (Tasm.); Ramsay, Proc. Linn. Soc. N.S.W., Ser. 2, Vol. I., p. 1085, 1887 (N.W.A.); *id.*, *ib.*, p. 1096 (N.W.A.); *id.*, Tab. List Austr. Birds, p. 1, 1888; *id.*, Cat. Austr. Accip. Suppl., p. 3, 1890; North, Aust. Mus. Cat., no. 12, p. 3, 1890; *id.*, *ib.*, no. 4, p. 12, 1898; Hall, Key Birds Austr., p. 4, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 6, 1901; A. G. Campbell, Emu, Vol. II., p. 10, 1902 (Vict.); Hall, *ib.*, p. 63 (N.W.A.); Le Souëf, *ib.*, p. 139, 1903 (N.T.); Hill, *ib.*, p. 161 (Vict.); Carter, *ib.*, Vol. III., p. 32, 1903 (W.A.); D'Ombrain, *ib.*, Vol. IV., p. 125, 1905 (Vict.); Berney, *ib.*, Vol. V., p. 16, 1905 (Q.); Hill, *ib.*, Vol. VI., p. 177, 1907 (Vict.); Batey, *ib.*, Vol. VII., p. 3, 1907 (Vict.); Gibson, *ib.*, Vol. IX., p. 72, 1909 (S.W.A.); Littler, Handb. Birds Tasm., p. 3, 1910 (Tasm.); North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 190, 1911; Macgillivray, Emu, Vol. XIII., p. 150, 1914 (Q.); Barnard, *ib.*, Vol. XIV., p. 41, 1914 (N.T.); Cheney, *ib.*, p. 203, 1915 (Vict.).

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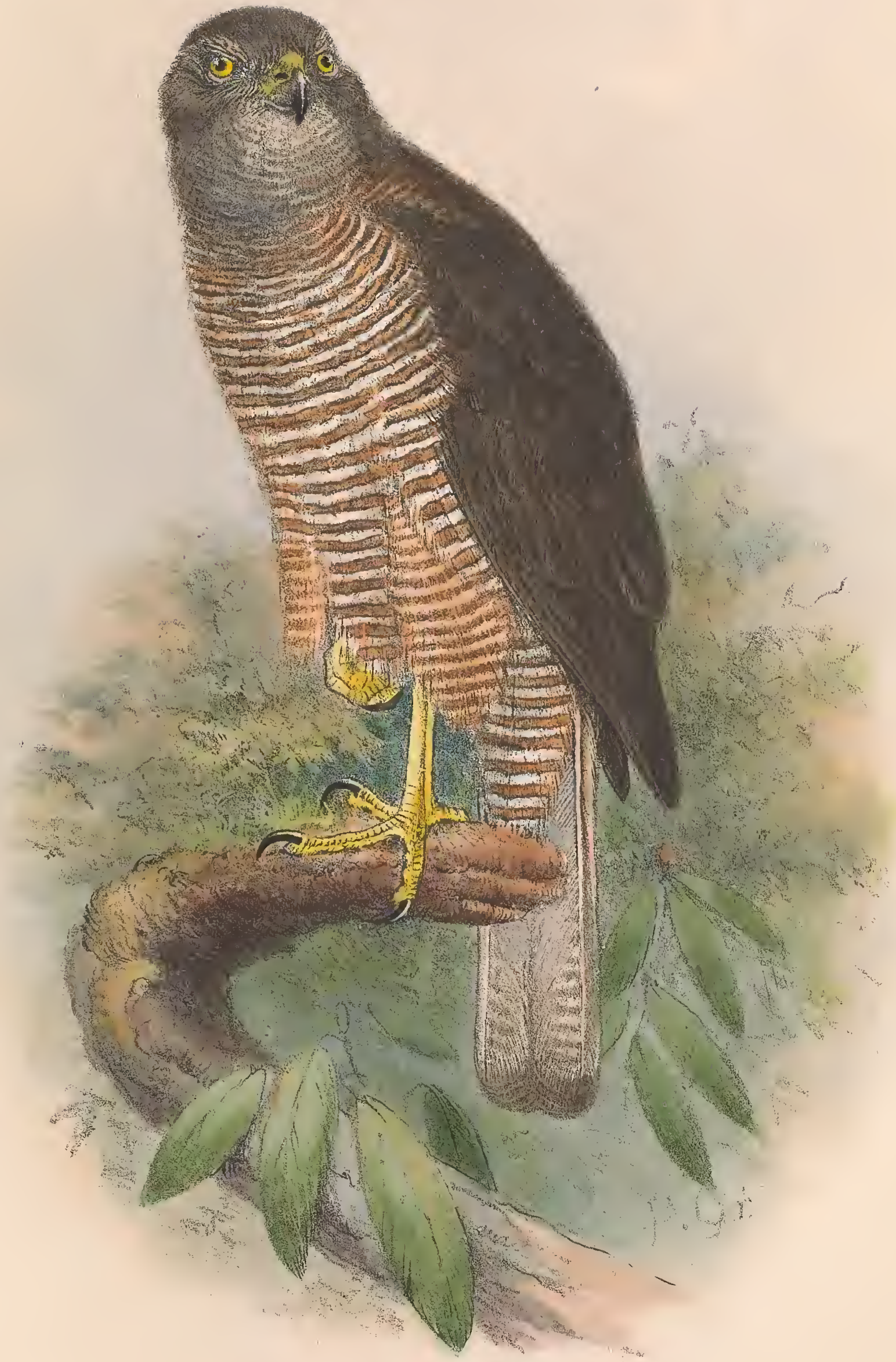
* The Plate is lettered *Astur cruentus.*



H. Grönvold. del

Witherby & C°.

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ASTUR CRUENTUS.

(*LESSER GOSHAWK*)

AUSTRALIAN GOSHAWK.

Astur cruentus Gould, Proc. Zool. Soc. (Lond.) 1842, p. 113, 1843 : York District, West Australia ; *id.*, Birds Austr., Vol. I., pl. 18 ; *id.*, Handb. Birds Austr., Vol. I., p. 43, 1865 ; Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 127, 1874 ; Ramsay, Cat. Austr. Accip., p. 15, 1876 ; *id.*, Proc. Linn. Soc., N.S.W., Vol. II., p. 177, 1878 ; *id.*, *ib.*, Ser. 2, Vol. II., p. 165, 1887, N.W.A. ; *id.*, Tab. List Austr. Birds, p. 1, 1888 ; *id.*, Suppl. Cat. Austr. Accip., p. 4, 1890 ; North, Austr. Mus. Cat., no. 4, p. 15, 1898 ; Hall, Key Birds Austr., p. 4, 1899 ; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 8, 1901 ; Hartert, Nov. Zool., Vol. XII., p. 207, 1905 (N.W.A.) ; Mathews, Handl. Birds Austral., p. 40, 1908 ; Wilson, Emu, Vol. XII., 1912, p. 31 (Vict. !) ; Stone, Austral Av. Rec., Vol. I., p. 145, 1913 ; H. L. White, Emu, Vol. XIV., p. 154, 1915 (W.A.).

Accipiter approximans Strickland, Ann. Mag. Nat. Hist., Vol. XI., p. 335, 1843 ; Bonaparte, Consp. Gen. Av., Vol. I., p. 33, 1850 ; Gray, Handl. Gen. Sp. Birds, pt. I., p. 34, 1869.

Falco canus Gray, Ann. Mag. Nat. Hist., Vol. XI., p. 189, 1843 ; nomen nudum.

Urospizia approximans Bonaparte, Rev. Mag. de Zool. 1854, p. 538.

Urospizias approximans Gurney, Ibis 1881, p. 261 ; *id.*, Cat. Diurn. Birds Prey, p. 38, 1884.

Astur maculosus Coles, Vict. Naturalist, Vol. XIV., p. 43, July 1897 : Blackburn, Victoria.

Astur fasciatus fasciatus Mathews, Nov. Zool., Vol. XVIII., p. 246, 1912.

Astur fasciatus mackayi Mathews, *ib.* : Mackay, Queensland.

Astur fasciatus cruentus Mathews, *ib.*

Astur fasciatus didimus Mathews, Austral Av. Rec., Vol. I., p. 33, 1912 : Melville Island, Northern Territory.

Urospiza fasciata fasciata Mathews, List Birds Austr., p. 103, 1913.

Urospiza fasciata cruenta Mathews, *ib.*, p. 104.

Urospiza fasciata didima Mathews, *ib.*

RANGE. Australia ; Tasmania.

Adult female. General colour of the upper-surface earth-brown with a tinge of grey and an indication of a brown nuchal collar ; quills rather darker than the back with dark barrings on the inner webs where they are mottled with rufous ; lesser upper wing-coverts very slightly edged with rufous ; fore-head minutely streaked with brown and white : sides of face grey ; throat white with grey mottlings ; under-surface chestnut, barred across with white as also the axillaries and under wing-coverts ; the rufous of the under-surface encroaches towards the upper sides of the neck. Bill dark horn, cere greenish-yellow ; iris straw-yellow ; tarsi and feet yellowish. Total length 530 mm. ; culmen 27 ; wing 303 ; tail 240 ; tarsus 88. Figured. Collected at Wilson's Inlet, South-west Australia, on the 7th of July, 1911.

Adult male. Similar to the adult female but smaller, with bars on the under-surface wider ; wing 262 mm., culmen 25, tarsus 77. Collected on the Coongan River, Mid-west Australia, on the 4th of July, 1908.

Immature female. General colour above brown, with pale rufous edges to the feathers, those on the back of the neck broadly margined with the same colour, the feathers of the head, hind-neck and back having white bases ; bastard-wing and primary-coverts brown barred with darker brown and more or less rufous on the inner webs ; primary- and secondary-quills similar, the latter being somewhat paler and with less rufous on the innermost secondaries ; second, third, and fourth primaries incised on the outer webs and also on the inner webs ; lateral upper tail-coverts barred with rufous; tail rather greyer than the back with numerous dark brown bars, whitish tips, and an inclination to rufous on the inner webs, particularly towards the base; superciliary line, sides of face, and throat white streaked with brown; feathers in front of the eye and lores very short and whitish; feathers of the breast white barred with rufous-brown and pear-shaped markings at the tips; abdomen, sides of body, and under tail-coverts white barred with pale rufous-brown; thighs more rufous and irregularly barred; under wing-coverts similar but the rufous-brown markings somewhat darker; base of quills pale cinnamon-rufous, becoming silvery-grey, with dark brown bars towards the tips; lower aspect of tail similar.

A pair from Victoria (*U. f. maculosa*) measure: Female wing 305 mm., culmen 25, tarsus 85. Male wing 268 mm., culmen 23, tarsus 75.

Birds from North-west Australia, Northern Territory and North Queensland can be separated on account of their bluish-grey backs (*didima*). Female wing 270 mm. to 280; males (Melville Island) 230 to 239.

Nestling. "Covered all over with creamy-white down." (North.)

Nest. A bulky structure made of sticks and lined with leaves.

Eggs. Clutch, two to four. Bluish-white, without gloss, sometimes marked with spots or blotches of reddish-brown or lavender. Axis 37-39 mm.; diameter 29-30 (Queensland).

Breeding-season. September to January.

THOUGH this bird has no ancient history as a recognisable entity, it was included among the Watling Drawings examined by Latham. One drawing was named in MS. by Latham "Ash-headed Falcon," and apparently a Latin name "*Falco canus*" was also applied. The description of the "Ash-headed Falcon" was given in the *Gen. Hist. Birds*, Vol. I., p. 219, 1821, but the Latin name was not recorded until Gray noted it in the *Ann. Mag. Nat. Hist.*, Vol. XI., p. 189, 1843.

Another drawing which Latham considered a representation of the "New Holland Sparrow Hawk" was so confused by Watling, who wrote: "Native name *Goo-roo-ing*. It is not a very common Hawk in New South Wales. A dark variety of the New Holland Sparrow Hawk, No. 21." No. 21 was, however, a picture of the Sparrow Hawk, not the Goshawk.

The extraordinary complications that ensued later will be detailed hereafter.

Though never regarded as a rare bird, there is not much life-history on record.

Mr. T. P. Austin has written me from Cobbora, New South Wales: "It is very seldom that I see this bird out in the paddocks, but it is no uncommon thing to see them about my house: they appear to take a great delight in perching on top of a very large aviary I have here, and in which I have some *Cacatua leadbeateri* and *C. roseicapilla.* I can always tell when there is a Goshawk about by the great commotion amongst the Cockies. I also have a large Sparrow trap, and strange to say, as soon as there are any

Sparrows in it, the Goshawks appear to find it out within a couple of days. I have only known them to breed here three times, twice in the same tree during successive years (1907-08) and they reared three young each time; from the other nest I took three eggs: it was placed near the top of a tall iron-bark eucalyptus, and although I had to pull a rope-ladder up to climb the tree, the sitting bird did not flush until I was within a few feet of the nest. These birds at times become very daring, and twice I have known them to come on to my verandah."

Capt. S. A. White has given me the following note: "This is a very common bird in South Australia, although there are not nearly so many as there used to be, due no doubt to the continuous war waged against them by the settler, for they are very bold birds and will persist in robbing the poultry yards in spite of being fired upon. Great difference exists between the size of both sexes, some of the old male birds not being half the size of the females: then again the great variety in plumage during the different phases of life is very perplexing. They build a stick nest and seem to prefer the native pine or the she-oak in which to build: the clutch is 3 or 4 in number, almost round, colour dull white, or bluish-white ground with very irregular blotches or smears of brown."

In no notes have I seen any observations with regard to the breeding of this bird in immature plumage. Yet this would appear to be a common occurrence according to Coles' report. This writer contended that Gould had erred in recognising the bird which he called the Spotted Goshawk as the young of the Australian Goshawk. He collected specimens for some time in Victoria and out of twenty-five birds, which he considered adult, only two of these were in the plumage of the adult Australian Goshawk, the other twenty-three being all the so-called immature. I conclude that some of these twenty-three must have been breeding to have been classed as adult, but no facts are on record. Coles went so far as to describe the "Spotted Goshawk" as a new species under the name *Astur maculosus*. Ignorant of synonymy, he was unaware that Vigors and Horsfield had described a bird in exactly the same stage of plumage as *Astur approximans* as noted by Gould. I have the types of both before me, and the latter is slightly more rufous, but otherwise agrees exactly in all its markings with Coles' types which he presented to the British Museum.

From North's *Austr. Mus. Spec. Cat.*, no. 1, p. 190-193, 1911, where, as usual, full accounts of the nidification and eggs appear, I collate the succeeding notes relating to the habits of this bird.

"Of the large number of these birds received . . . the greater number have been shot while raiding poultry-yards, pilfering chickens which have the run of the bush, or chasing pigeons. . . . A young *Astur approximans* attacked and almost killed a full-grown Leghorn fowl here last Wednesday: the hen is not able to walk yet and the Goshawk never will again. . . . In a series of sixty-six specimens now before me, only eighteen are skins of fully adult birds. . . ."

Mr. G. Savidge, of Copmanhurst, Upper Clarence River, New South Wales, noted: "This is the commonest species of the Order inhabiting this district. It is a very destructive bird amongst the outback settlers, preying upon young chickens, etc., whenever it gets the chance, hence a large number are shot every year. A fairly strong pigeon can nearly always elude capture from this bird; it has nothing of the bold dash of the Black-cheeked Falcon. From my observations it appears to obtain most of its food by pouncing upon young birds, etc., and by stealing a march upon them about dusk. I have observed it several times chasing birds just before dusk, when they were going to roost."

This was confirmed by Mr. H. L. White, of Belltrees, Scone, New South Wales, who wrote: "The Goshawk gives a lot of trouble in the poultry-yards during the summer months. I sometimes shoot one a day for some weeks. If left to itself each Goshawk takes a chicken or pigeon every day. It is an interesting sight to watch a Goshawk after a flock of pigeons, the aim of the first-named being to get above its prey; having done so, after much manœuvring, a sudden dart downwards, a quick blow, and a dead pigeon is the result. Some years ago numbers of pigeons were raised in this locality for the Sydney Gun Club, but owing principally to the ravages of *Astur approximans*, the industry was abandoned. I have seen a Goshawk caught in a wire fowl coop, into which it had dashed after a chicken. Nests are fairly numerous, and are usually built well away from settlement. I have known the bird to lay a second time in the same nest, after being robbed of the first clutch."

Mr. K. H. Bennett further added: "*Astur approximans* is rarely met with on the plains, but is common in densely-timbered districts. In habits it is rather inactive, capturing its prey, which consists chiefly of various birds and their young, more by stealth than by chase. I have on several occasions observed this species in the dusk of evening actually engaged in the capture of large Coleoptera, and the crop of one I shot was full of beetles."

Dr. M. MacGillivray also recorded: "*Astur fasciatus* is the only Goshawk that I have seen in the district. It is universally distributed along the creeks which traverse the open plains, or find their way through the rocky hills of the Barrier Range, and also in the Mulga Scrubs. In seasons when food is scarce afield, it will come into Broken Hill, and has been repeatedly known to kill tame birds in private gardens, and to take canaries out of their cages under a verandah. A bird of this species killed several Silver Gulls (*Larus novæhollandiæ*) which were kept as pets at liberty in a garden. This Goshawk is dreaded by all smaller birds, and unlike the Falcons, which kill in the air, and from whom a bird in a bush or thicket is safe, the Goshawk will pursue a bird through the thickest bush or scrub with lightning-like rapidity, and often take young birds from the nest. . . . Nesting commences early in September, eggs being usually found about the middle or end of the month; three is the usual clutch, four occasionally, and often only two. The bird is wary, and flushes from the nest on anyone coming within sight or hearing, slipping off through the timber with a gliding flight which would, perhaps, escape notice but for the cries of alarm set up by all the small birds in the neighbourhood."

D'Ombrain (*Emu*, Vol. IV., p. 125, 1905) recorded: "My note about this Hawk (*Astur approximans*) is made from two young ones which I had in captivity. I was trying to train them for hawking, but found them too wild to stand having the hood on. When chained near each other they fought continually, and at last the female, getting her chain loose, attacked her mate, and killed and ate him. Like the rest of their genus, they spend a lot of their time watching their prey to find the most favourable moment for striking. Pieces of food thrown in the air to them were always caught in the talons before they reached the ground. The iris of the eye in the young is at first merely a pale whitish colour, which gradually deepens to a bright lemon-yellow as they mature."

Berney's notes from North Queensland (*Emu*, Vol. V., p. 16, 1905) read: "The Goshawk is not uncommon; it is a short-winged and round-winged bird, the latter being caused by the first two primaries, of which the first is much the shorter, being considerably less in length than the next three, which are much of one length. I never see it soaring or manœuvring in the open sky; it trusts rather, when on the hunt, to rapid movements in open timber, darting here and there between the trees and sweeping round bushes on the chance of taking its prey unawares. If once its intended victim gets properly going I doubt if it ever pursues. Between times it sits motionless in the foliage of a tree, watching and listening like a gamekeeper at the corner of a copse."

Miss Cheney, in the *Emu*, Vol. XIV., p. 203, 1915, wrote from Victoria: "This species was frequently seen around haystacks, looking for mice and lizards. It was very common, and was certainly responsible for the deaths of many small birds. The Red-backed Parrot, in particular, is attacked by it, specimens frequently being found with the lower beak cut completely off and the tongue pierced by the powerful hind claw of this Goshawk. It is one of the most fearless of the Hawks. We compelled a Goshawk to drop its prey just at the point of capture, and, hiding the small bird under a tree, sat down to await developments. At first the Goshawk tried to frighten us by swooping around, and failing that, retreated to a distant tree as though giving up all idea of regaining what it had lost. After twenty minutes' waiting it sidled along a fence, where it probably thought that we could not see it. Again checked, it returned from another direction several times, until it was able to snatch the dead bird. Farmers believe that many of their losses in chicken-rearing are due to this bird. A form with a richer-coloured back may possibly be *A. cruentus*, the Lesser Goshawk."

This reference to *A. cruentus* as occurring in Victoria seems to have originated in an idea owing to the individual variation seen in this species. Campbell (p. 8) writes: "Victoria (casual); while individuals casually reach eastern parts." As will be hereafter shown, "*cruentus*" has been misapplied and the true *cruentus* is scarcely separable from the Victorian bird, and could not be recognised at sight if at all. As far as I can judge, the older birds are more coloured as to the back, but soon wear dull; consequently Miss Cheney's bird would be a freshly-moulted old bird. I have such under my eyes now from Victoria procured at the same time and place as dull-colored birds.

The following note by Mr. Tom Carter is the only one I have with reference to the true *U. f. cruenta*: "The Goshawk is fairly well distributed through the State, but much more numerous in the Mid-west than South-west, as all bird-life is much more plentiful there (except when a drought is on). About Broome Hill they seem to be fond of catching and eating the Magpie Larks (*Grallina picta*)."

I have no notes about *U. f. didima*.

As an introduction to the complicated history of the nomination of this bird I would quote Gould's account: "Among the whole of the Australian Falconidæ there is no species the scientific appellation of which is involved in so much confusion as that of the present bird. This has arisen from two causes—first, from its having been erroneously considered to be identical with the *Falco radiatus* of Latham, from which it is entirely distinct; and secondly, from the difference which exists between the plumage of the adult and young being so great as to have led to a multiplication of specific names. Seven specimens of this Hawk formed part of the collection of the Linnean Society, now dispersed, and were those from which Messrs. Vigors and Horsfield took their descriptions of *Astur radiatus, A. fasciatus* and

A. approximans; from the careful examination I made of these specimens, I was satisfied that they were all referable to the present bird—*A. radiatus* being the young male, *A. fasciatus* the adult, and *A. approximans* the young female. I have retained the term *approximans* in preference to either of the others, because *radiatus* actually belongs to another species, and the employment of *fasciatus* might hereafter lead to its being confounded with the 'Fasciated Falcon,' an Indian species described under that name by Dr. Latham."

Gould's rectification would seem to have made a clearance, but peculiarly enough he had described a new species, *Astur cruentus*, which induced more confusion than any previously formed. I am somewhat at a loss to account for the peculiar views held with regard to this "form." I don't think I can do better than quote North's account given in the *Austr. Mus. Cat.*, no. 4, p. 16, 1898:

"None of our Australian Accipitres have puzzled ornithologists as much as the present species. Gould, who described and figured it under the name of *Astur cruentus*, states in his 'Birds of Australia,' that it is very common in Western Australia, particularly in the York District, and at the Murray. Whether he was quoting from Gilbert's notes, or whether the statement was only a surmise on Gould's part, it is impossible to say, but the fact remains that this species is undoubtedly the rarest of all our diurnal birds of prey. The late Mr. J. H. Gurney considered *A. cruentus* to be a synonym of *A. approximans*, a belief also for many years partly shared by Dr. Ramsay. Mr. George Masters did not meet with it on either of his collecting trips to Western Australia in 1863 and 1868. Mr. E. J. Cairn and the late Mr. T. H. Boyer-Bower spent over twelve months collecting at Derby, in the north-western part of that colony, and although both obtained several specimens of *A. approximans*, it was only a short time before the decease of the latter gentleman that he was enabled to send a box to Dr. Ramsay for examination which contained examples of the true *A. cruentus* of Gould. These were at that time the only known specimens obtained since Gould described the type nearly half a century before. Count Salvadori, who, however, has had the advantage of examining a typical specimen of Cuvier's *Falco torquatus* in the Leyden Museum, and which Temminck, in his description of this species in his 'Planches Coloriées,' in 1823, states is found in Northern Australia, Timor, and the Moluccas, pronounces Gould's *A. cruentus* identical with this species, and also *Nisus australis* in the Paris Museum, described by Lesson in 1831 from a specimen brought by Péron from West Australia. Count Salvadori also ranks *Astur sharpii*, of Ramsay, from Port Moresby, New Guinea, as a synonym of *A. torquatus*.

"Dr. Sharpe refers the New Guinea examples with the barred under tail-coverts to *A. cruentus* of Gould, and considers them distinct from *A. torquatus* of Cuvier, as the specimens of the latter in the British Museum collected by Dr. Wallace in East Timor have the under tail-coverts white. Temminck's plate of the adult of this species also represents the under tail-coverts as greyish-white and unbarred. However closely the *Astur* from New Guinea, described by Dr. Ramsay under the name *A. sharpii*, resembles the Continental form, I cannot agree in regarding it as the same as *A. cruentus* from North-west Australia. I have three adult specimens of *A. sharpii* now before me, including presumedly the type, and will point out where they differ from the latter species. The collar on the hind-neck is paler and of a tawny-rufous: the under-surface is tawny-red and is more numerously crossed with narrow, transverse, dull white bars in the male, and ashy-grey on the breast in the female; in both sexes also a faint wash of tawny-red extends all over the mottled greyish-white throat. The under tail-coverts vary considerably: in the female they are dull white, conspicuously barred with rufous; in one of the males the cross-bars are much narrower, and in the other they are reduced to narrow indistinct transverse lines. In a specimen of *A. cruentus* from Derby (North-west Australia) the collar on the hind-neck is darker and of a chestnut-red: the under-surface is not so rich in colour as the New Guinea examples, being of a pale rufous, conspicuously barred with dull white, these barrings being bordered above and below with a narrow line of dark ashy as in *A. approximans*; there is no faint wash of rufous on the throat, and the under tail-coverts are similarly marked as the breast, with the exception of having the dull white cross-bars very much broader. Although the New Guinea and North-west Australian birds can thus be distinguished from each other, and the name of *A. sharpii* is preoccupied by Oustalet, I do not care to suggest a new name for the *Astur* from New Guinea, as the variable character of the under tail-coverts tends to prove that Count Salvadori is correct in referring it to *A. torquatus*. If *A. australis* from West Australia is identical with *A. torquatus* from Timor, as stated by Count Salvadori, Lesson's name must rank as a synonym of the latter species, but if it is the same as Gould's *A. cruentus*, Lesson's specific name of *australis* must take precedence. As some doubt exists to which species the latter name was applied, I have for the present retained Gould's name of *A. cruentus* for the small Goshawk from North-west Australia."

If the birds had been considered geographically, the foregoing account would have been practically unnecessary. The type-locality of Gould's *A. cruentus* was the York District, West Australia, and birds from that locality must be considered typical. If Gould's coloured plate did not exactly agree, the differences must be due to individual variation, or it might have been an aberration. If Lesson's bird really came from West Australia his name would have priority and must be used. When Salvadori lumped all the birds from Timor, New Guinea and West Australia he confused this issue, and at the present time the bird cannot be re-examined. Recent workers on the Moluccan and New Guinea fauna differentiate *A. torquatus* specifically from *A. fasciatus,* so that a conclusion, when the bird is available, should be easy. Thus in 1898, ignorant of North's simultaneous conclusion, Hartert (*Nov. Zool.,* Vol. V., p. 122) had written: "I cannot bring myself to unite with *A. torquatus* the Australian *A. cruentus,* which seems to differ in being more regularly barred below and in having a longer tarsus. The birds from New Guinea are probably not separable from the latter."

This year, however, Rothschild and Hartert (*Nov. Zool.,* Vol. XXII., Feb. 12, 1915) have given the following account under the name:

"p. 52. *Accipiter fasciatus polycryptus.*

"'*Astur fasciatus*' was first described by Messrs. Vigors and Horsfield from 'Australia' in 1827, and this name, as pointed out by Hartert in 1905, stands before *A. approximans* on the same page, which latter name has been arbitrarily chosen for these hawks by Gould, Sharpe and others. Mr. Mathews, in his most recent list of the Birds of Australia, pp. 103-104, separates three races:

"*A.* (or *Urospiza,* as he calls them) *fasciatus fasciatus* (=*approximans*) from the eastern parts of Australia.

"*A. fasciatus cruentus,* from Southern and Mid-west Australia.

"*A. fasciatus didimus* from Melville Island and the Northern Territory.

"We have nine adult females, and one adult male (besides some young birds which are of no use for distinguishing such closely-allied subspecies) from Queensland, an adult pair from the Alligator River in 'Northern Territory' and an adult pair from West Kimberley and Point Cloates. These seem to confirm the three races accepted by Mr. Mathews. The two birds from the Alligator River are not so brownish, but more reddish underneath, and the white cross bars in the male are narrower and more numerous. The female from Point Cloates and the male from West Kimberley are somewhat larger, and the underside is more cinnamon rufous, less brownish: the white bars are rather narrow.

"The series from Queensland would be *A. fasciatus fasciatus,* the pair from the Northern Territory *A. fasciatus didimus,* the pair from Point Cloates and West Kimberley *A. f. cruentus.*

"In addition to these races, which require further confirmation by better series from the northern and western parts of Australia, we have another from

New Guinea, at least a number of birds, undoubtedly of a race hitherto undescribed, and in our opinion a form of *A. fasciatus.* We name this race *Accipiter fasciatus polycryptus,* subsp. nov. It differs from (the males of) *A. f. fasciatus* very strikingly by the more reddish colour of the underside, with very narrow, in places obsolete, whitish bars and smaller size. It is therefore more similar to *A. f. cruentus* and *didimus,* but still more and lighter reddish underneath and less sharply barred, also markedly smaller. The colour of the upperside is also slightly more bluish. Type ♂ ad. Sogeri district, 2000-3500 ft., British New Guinea. Wing 230 mm."

While it would be easy to cite the above as confirmation of my subdivision and good judgment, I prefer to work to the facts. Rothschild and Hartert have not exactly quoted my localities for my races, as I called North-western birds *A. f. didimus,* and the West Kimberley bird would be there classed and not with *A. f. cruentus.* I will discuss these further on, but would here point out the puzzling item in Rothschild and Hartert's note. They write "undoubtedly of a race hitherto undescribed," but from North's note preceding, their race had "undoubtedly been described" by Ramsay as *A. sharpei.* As I could scarcely believe such careful workers as Rothschild and Hartert could make such an obvious blunder, I have carefully studied North's account of Ramsay's birds and it seems strictly applicable to Rothschild and Hartert's new subspecies. In this case it is very fortunate that Ramsay's name is preoccupied. The only alternative is that they considered Ramsay's name referable to some other bird, in which case they should have made a note to that effect.

To return to Australian forms, when Hartert revived *A. fasciatus* he wrote (*Nov. Zool.*, Vol. XII., p. 207, 1905): "The underside of this species is barred with brown and white, the white bars being as wide or a little narrower than the brown ones, which are rufous-brown, with darker edges. There is great variation in size, the females alone varying in the wing from 268 to 291 mm. Males are strangely rare in collections, at least adult ones. They are sometimes exactly like the females, only smaller: sometimes, however, much more reddish, but the dark bars of the under-surface paler, more reddish, the white ones narrower. Such specimens are hardly distinguishable from females of *Astur torquatus torquatus* from Timor, except that the bill is smaller. If they really are males they can only be the males of *approximans.* The males are very much smaller, the wings measuring only 228 to 247 mm. Specimens from Queensland, North and North-west Australia, agree fairly well with each other, though somewhat variable. A specimen shot in the 'North of Victoria' is much darker brown above, and the brown bars below are very broad and dark. It is possible that a series shows similar differences, in which case we should distinguish a darker subspecies in Victoria." He then added "*Astur cruentus* Gould" for a bird from West Kimberley explaining: "I have named this specimen *cruentus*, as Sharpe, Robinson and Australian authorities have named similar specimens *cruentus*. They are underneath light rusty-cinnamon with narrow white bars. The rufous band on the hind-neck is wide and uninterrupted. The wing of this bird (marked ♂) measures 270 mm., that of a female from Point Cloates 310 mm. It is possible that these birds do not belong to *A. cruentus*, though it is by no means certain. Mr. Rothschild thinks they must be the same, since the variation of *A. fasciatus* (= *approximans*) and that of *torquatus* from Timor is considerable."

As recently as December 21, 1912, Rothschild and Hartert had recorded (*Nov. Zool.*, Vol. XIX., p. 190) a bird from the Kumusi River, North-eastern British New Guinea as ? *Astur cruentus* with a note: "Besides this specimen we have another male from Nicura, in British New Guinea, which is similar. Unfortunately we have no Australian specimens for comparison, but Gould's figure shows a bird with a more whitish under-side and wider bars. *Astur cruentus* ? may be only a sub-species of *Astur torquatus*."

Compare this with the preceding account written seven years previously and with Hartert's statement of 1898 above quoted, and it must be conceded that, whether the birds be considered puzzling or not, the writers who have dealt with them have manufactured puzzles enough. Again, note there is no mention of Ramsay's *A. sharpei*, which was described from British New Guinea.

In the *Nov. Zool.*, Vol. X., p. 20, 1903, Hartert discussed the races of *Astur torquatus*, admitting:

Astur torquatus torquatus.	Timor, Savu, Alor.
wallacii.	Lesser Sunda Islands.
cruentus.	W. Australia and Southern New Guinea.
sumbaënsis.	Sumba.

The recent nomination of *A. fasciatus polycryptus* would imply the rejection of *torquatus* as the specific name, but would also indicate the extreme closeness of *torquatus* and *fasciatus*. The preceding accounts will show that "*polycryptus*" was referred to *torquatus* by Hartert above, also by Salvadori, and tentatively accepted by North as also quoted. Typical *torquatus* differs slightly from typical *fasciatus*, but inasmuch as *cruentus* has been referred to both, it will be admitted that the differences are not particularly striking. The immature of *torquatus*, however, differs rather noticeably from the immature of *fasciatus*, and for that reason alone I at present keep them separate. When series of plumage changes are studied it may be that only one species will be recognised. At any rate, all the Australian birds as far as at present known are referable to one species and, moreover, the subspecies seem very ill-defined. I have attempted to indicate such, but my attempts read as confusedly as Rothschild and Hartert's, and it must be obvious that when Gould wrote of the confusion of the nomenclature, he might have been anticipating the confusion of forms. If we simply treat them geographically we would arrive at some such grouping as the following:—

Urospiza torquata	*torquata.*	Timor, Savu, Alor.
	wallacii.	Lesser Sunda Islands.
	sumbaënsis.	Sumba.
Urospiza fasciata	*polycrypta.*	New Guinea.
	didima.	North West Australia.
	cruenta.	West and South-west Australia.
	fasciata.	East Australia.
	insularis.	New Caledonia.

This would be a nice result and would probably be a true one, but definition of the preceding races would be difficult. Variation has produced specimens in almost every locality agreeing with odd birds from some other. Thus specimens of "*cruenta*" are inseparable from "*fasciata*" typical, while other birds of "*cruenta*" are just as close to "*polycrypta*," though typical "*cruenta*" are abundantly distinct from typical "*fasciata*," and typical "*polycrypta*" are separable from "*cruenta*" typical. Moreover, "*polycrypta*" has been referred to "*torquata*," and "*wallacii*" by such authorities as Sharpe and Salvadori.

As regards Australian birds my separation into three races as quoted (not exactly) by Rothschild and Hartert is a very dubious result, and the much abused "*cruenta*" seems after all to be the almost negligible subspecies. The Northern form I have called "*didima*" seems to be better defined and to be what Hartert, Ramsay and North have recognised as "*cruenta*."

I would quote the latest remarks upon the subject, viz. those by H. L. White (*Emu*, Vol. XIV., p. 154-156, 1915), entitled: "Notes upon *Astur cruentus* (*Urospiza fasciata cruenta*)."

"A considerable amount of uncertainty has always existed with regard to this bird, and Mr. A. J. North's note (Vol. III., p. 194) in 'Nests and Eggs of Birds found Breeding in Australia and Tasmania' still further confuses matters. During Mr. G. M. Mathews' visit to Australia he spent several days with me, examining all my specimens most carefully. Concerning *Urospiza fasciata cruenta*, he postponed giving a final opinion until he handled Gould's type skin in the Philadelphia Museum. He now writes from England to the effect that he has examined the type skin, and finds it to be the common bird of Western Australia, and not the rare bird mentioned by Mr. North, as referred to above. Skins forwarded to me by Mr. H. G. Barnard from the Macarthur River, Northern Territory, were identified by Mr. Mathews as *Urospiza fasciata didima* (Mathews). These same skins, upon comparison with those mentioned by Mr. North and in the Australian Museum, are found to be slightly different; it is evident, therefore, that if Mr. North's bird is neither *U. f. didima* nor *U. f. cruenta* it must be either a freak or a new subspecies.

"I am unable to say whether *Urospiza fasciata didima* is uncommon throughout the whole of North Australia, but the birds are fairly plentiful on the Macarthur River, where Mr. H. G. Barnard secured several skins and clutches of eggs; one of the latter I claim to be the type, and describe it elsewhere in the present issue of *The Emu.* It is now evident that Mr. Mathews in his latest list (1913) has placed the distribution of the species correctly as follows:

Urospiza fasciata fasciata.	Eastern Australia.
Urospiza fasciata cruenta.	Western Australia.
Urospiza fasciata didima.	Northern Territory and North-west Australia.

"Unfortunately I have not the measurements of a female specimen of Mr. North's rare bird, but the undermentioned measurements of male skins of the species may be of interest:

	Total Length.	Wing.	Tail.	Tarsus.	Culmen.
Urospiza fasciata didima, collected by H. G. Barnard at Macarthur River, Northern Territory	381	248	191	70	19
Australian Museum specimen, labelled *Astur cruentus*, recorded as from Derby, Western Australia (north-west), about 17° S.	393	267	216	74	23
Australian Museum specimen, labelled *Astur approximans*, recorded as from Yane Creek, 100 miles from Port Darwin	388	248	191	67	23
A typical skin of *Astur approximans*, according to A. J. North, Vol. III., p. 190, 'Nests and Eggs' ..	419	258	212	80	26

"The above, taken in conjunction with the following measurements of female specimens, should, I think, go a long way towards proving Mr. Mathews' contention to be correct:

		Total Length.	Wing.	Tail.	Tarsus.	Culmen.
U. f. didima,	Parry Harbour, N.W.A. (not fully adult) ..	430	275	225	78	27
,,	Napier Broome Bay, N.W.A. (not fully adult)	442	280	230	78	27
,,	Napier Broome Bay, N.W.A. (a very old bird with exceedingly dark plumage) ..	465	285	240	80	28
,,	Macarthur River, N.T. (fully adult, breeding)	460	280	225	78	25
U. f. cruenta,	Nullagina, Pilbarra goldfield, W.A. (fully adult, breeding)	485	300	245	80	25
,,	Wilson's Inlet, near Albany, W.A. (fully adult, breeding) ..	483	295	245	76	28
U. f. fasciata,	A typical Eastern specimen, according to A. J. North, Vol. III., p. 190, 'Nests and Eggs'	491	309	254	82	30

(My specimens are all slightly larger.)"

Careful consideration of the whole of the birds available at the present time confirms the acceptance of the form "*didima,*" but the form "*cruenta*" is somewhat doubtful. It is possible, however, that the young may show tangible differences, and it must be emphasized that immature specimens seem more plentiful from some localities than others. The variation in the degree of the coloration of the under-surface is very perplexing, and the broad and narrow bars seem due to age. Thus from one locality birds are obtained showing pale narrow bars and darker broad bars: these latter are undoubtedly, to me, immature—that is, they present the first phase in the mature plumage; succeeding moults will bring the bird into the light narrow-barred plumage.

The name, *Nisus australis* Lesson, cannot be fixed to anything at the present time. In the *Ibis* 1881, p. 261 *et seq.*, Gurney discussed "*Urospizias* *approximans*" and made notes upon the variation observed. He commented upon Salvadori's recognition of the New Guinea birds as being referable to *torquatus*, and considered them as distinct under the name *sharpei* Ramsay, and approaching nearer to *approximans* than *torquatus*. He also discussed the New Caledonian form which Sarasin (*Vögel Neu-Caledoniens*, p. 8, 1913) has named *Astur approximans insularis*. I hope to discuss this form later. In the same place (*Ibis*, p. 605-7) Salvadori replied, observing that if the New Guinea bird were considered distinct it would need a new name, as *Astur sharpei* Ramsay was preoccupied. Salvadori also stated that when he examined Lesson's type of *Nisus australis* he did not accept any differences between the *torquatus* and *approximans* group as later admitted, and he therefore was unable to decide whether Lesson's bird was the Timor or West Australian. In view of this, Lesson's name cannot be correctly utilised until re-examination of the bird is made.

In view of the continued discussion about *Astur sharpei* Ramsay, I am more than puzzled at the lack of mention of it by Rothschild and Hartert when they described *Accipiter fasciatus polycryptus*. Such an oversight suggests the possibility of other names being overlooked and causes uneasiness as to the acceptance of their results.

As before indicated, in determining the subspecies in this group the personal equation predominates, and I would at the present time class *U. f. cruenta* as a very doubtful form and range the species thus:

Urospiza fasciata fasciata (Vigors and Horsfield). South Australia; Tasmania; Victoria; New South Wales; South Queensland.

Of this form, *Astur approximans* Vigors and Horsfield and *Astur maculosus* Coles are synonyms, both based on the immature plumage of this species, the former from New South Wales, the latter from Victoria.

Hartert suggested there might be a darker subspecies in Victoria, as one specimen was "much darker brown above," but did not observe there was a name already applicable if such should prove the case. I have similar dark-coloured birds, also from Victoria, but procured at the same time and place are typical specimens showing this to be merely a phase and consequently negligible without long series.

Urospiza fasciata didima (Mathews). North Queensland; Northern Territory; North-west Australia.

Doubtful subspecies are:—

Urospiza fasciata cruenta (Gould). West Australia.

This may be *Nisus australis* Lesson, which name has priority, but at the present time the type is inaccessible.

Urospiza fasciata polycrypta (Rothschild and Hartert). British New Guinea.

Of this, *Astur sharpei* Ramsay 1879, not Oustalet 1875, Port Moresby, is a synonym, but this form must be compared with longer series of *U. f. didima* before it can be accepted.

Urospiza fasciata insularis (Sarasin). New Caledonia.

I will consider this later, but the locality above would suggest its validity, though Sarasin's differential features are comparatively valueless, owing to their variability.

GENUS—ACCIPITER.

ACCIPITER Brisson, Ornith., Vol. I., p. 310, 1760 .. .. Type *A. nisus.*

Nisus Daudin, in Hist. Nat. Buffon, ed. Didot, Quadr., Vol. XIV., p. 220, 1802 (ex Lacepède, Tabl. Ois., p. 4, 1799; nom. nud.) .. .. Type *A. nisus.*

Ierax Vigors, Zool. Journ., Vol. I., p. 328, 1824 .. .. Type *A. fringillarius.*

Also spelt—

Hierax Agassiz, Index Univers., p. 182, 1846.

Hieraspiza Kaup, Classif. Saugeth. Vögel, p. 116, 1844 .. .. Type *A. cœrulescens.*

Also spelt—

Hieracospiza Agassiz, Index Univers., p. 182, 1846.
Jeraspizia Kaup, Archiv. fur Naturg., 1850, p. 34.
Teraspiza Kaup, Proc. Zool. Soc. (Lond.) 1867, p. 171.
Hieraspizias Ridgway, Bull. U.S. Geol. Geog. Surv., Vol. II., p. 92, 1876.
Hiracospizias Heine and Reichenow, Nomencl. Mus. Heine, p. 253, 1890.

Cooperastur Bonaparte, Rev. Mag. de Zool. 1854, p. 538 .. .. Type *A. cooperii.*

Leptohierax Sundevall, Oefver. Kongl. Vetensk. Akad. Forhand, No. 2, p. 24, 1874 .. Type *A. cooperii.*

SMALLEST Aquiline birds with short bills, long wings, very long tail, medium legs and very long middle toe.

In general characters this genus agrees with the preceding one, but is differentiated at once by the peculiar lengthened middle toe.

The birds classed under *Accipiter* may not be congeneric when the internal structure is critically examined, and a few remarks relative to the use of generic names may be here made. At a recent meeting of the British Ornithologists' Club the factor of coloration as a guide to generic affinity was discussed. The general opinion of the older school of British Ornithologists was voiced as a confirmation of the dictum of Linné, which has been translated: "Species are real, genera ideal." However, while accepting this Linnean dictum, which can be scarcely applicable in its orginal sense, in the twentieth century, the majority of the speakers argued that genera were simply matters of convenience and had no standing in nature. As an instance, the present association of species was quoted, as one worker had grouped together all the species generally referred to *Accipiter* and *Astur* under one generic name. This was combated on the score of convenience, "as these were natural genera." Such inconsistent argument does not please me. If genera be natural, convenience cannot enter into a discussion, and if convenience govern, then there can be no recourse to natural genera.

As I view genera, they are associations of species showing natural affinity. When two species show discord I separate them and thereby indicate that there is a cause for investigation.

In the present case we have a series of birds classed under *Accipiter* which do not show all the same relationship to each other, but which have one common structural feature, viz., the lengthened middle toe. Another series classed under *Astur* show very similar structural features throughout, save that they lack the elongation of the middle toe. It must be conceded by any thinking person that on the score of convenience these two names should be upheld. It must be convenient to be able to place a bird in a smaller group by such a feature. However, it has been argued by thinking workers that convenience is gained by lumping these so that whether the long middle toe is present or not no one is the wiser without criticising double the number of species. *I cannot understand that kind of convenience and consequently do not utilise it.*

I prefer to be able to identify a bird by means of features which can be recognised at sight. Thus the lengthened middle toe enables me to regard the bird as a representative of *Accipiter sensu lato*. Then I conclude, should further criticism necessitate it, I would subdivide that into different subgenera or sections. In this Order I am convinced that anatomical study is necessary to determine the limits of the genera, so in the present case am regarding the Australian representative of *Accipiter* as referable to *Accipiter sensu lato*. I would, however, regard the species *cirrhocephalus* Vieillot as very closely allied to the preceding genus *Urospiza*, and would not be surprised to find it, on anatomical examination, to be more nearly related to that genus than to *Accipiter* where it is now placed. It agrees in coloration with *Urospiza* and passes through the same plumage changes. In order to emphasize this peculiarity, I propose for *Sparvius cirrhocephalus* Vieillot the new subgeneric name

PARASPIZIAS.

Since this determination I have noted that Gurney (*Ibis* 1875, p. 474) wrote: "There remains but one other section of the Sparrow-Hawks included by Mr. Sharpe in the genus *Accipiter* which appears to me to be distinctly separable from the central group, of which *A. nisus* is the type, namely, that which is composed of those species which assimilate in the character of their markings and coloration to the Asturine subgenus *Urospizias*. These are three in number, viz., *A. cirrhocephalus*, *A. rubricollis*, and *A. erythrauchen*."

The bill is very short and formed as in *Urospiza*, the loreal bristles covering the oval semi-operculate nostrils.

The wing is long, the first primary very short, the fourth longest, the third subequal with the fifth, and the second less than the sixth.

The tail is very long, square, and about equal to three-fourths the length of the wing.

The tarsus is more than one-third the length of the tail, and in the adult shows a complete fusion both in front and behind; in the immature, however, the face is seen to be regularly scutellated and the back to be covered with reticulate scales, a few of which towards the hind toe are larger and look like scutes.

The feet are slender, the middle toe especially lengthened and more than half the length of the tarsus.

No. 296.

ACCIPITER CIRRHOCEPHALUS.

COLLARED SPARROW-HAWK.

(PLATE 239.)

SPARVIUS CIRROCEPHALUS Vieillot, Nouv. Dict. d'Hist. Nat., Vol. X., p. 329, 1817; New South Wales.

N(ew) Holland Sparrow-Hawk Latham, Gen. Synops. Birds, Suppl. II., p. 51, 1801; New South Wales.

F(alco) nisus (not Linné) Latham, Index Orn. Suppl., p. xi., 1801.

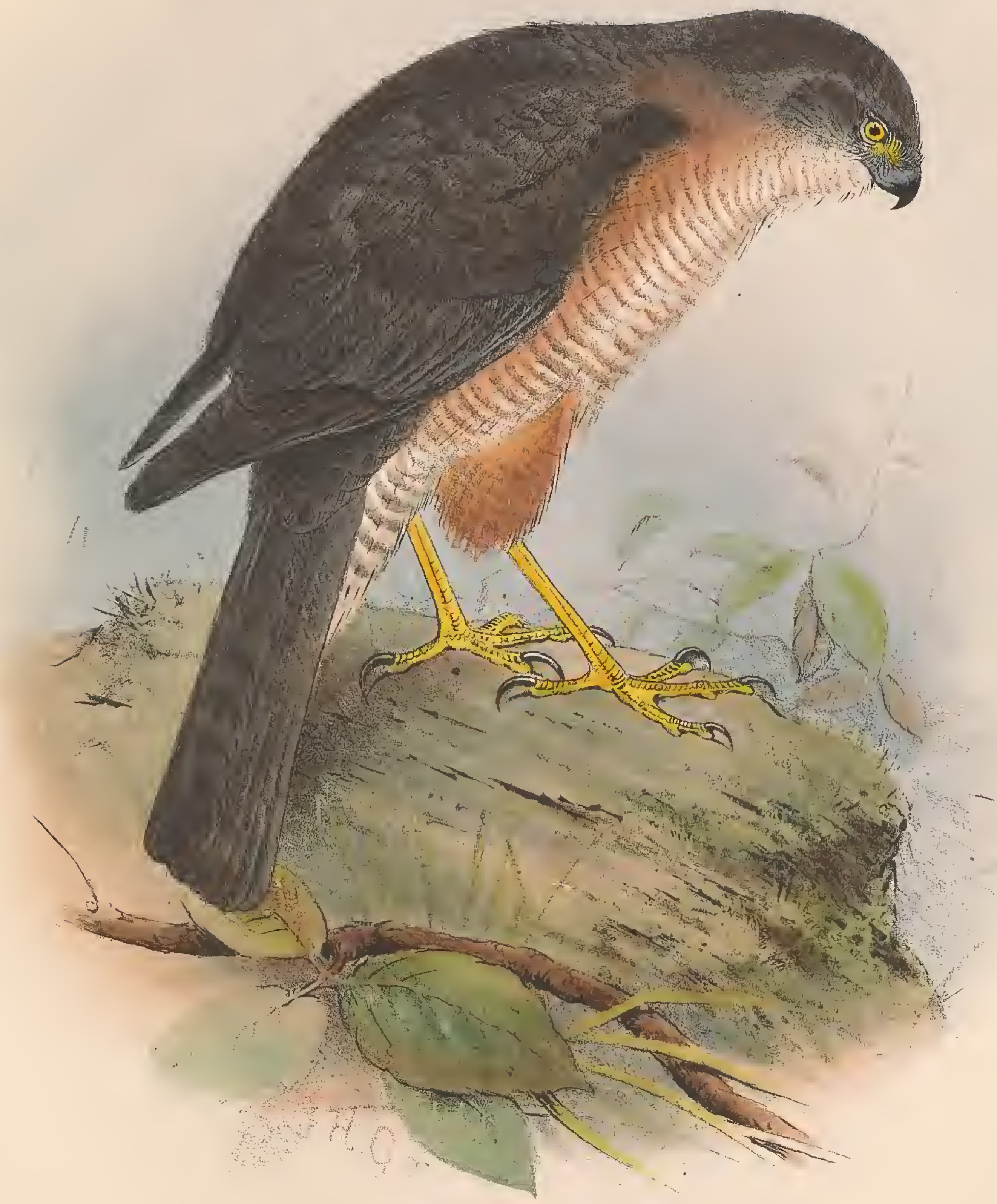
Sparvius cirrocephalus Vieillot, Nouv. Dict. d'Hist. Nat., Vol. X., p. 329, 1817.

Accipiter torquatus Vigors and Horsfield (not Temminck), Trans. Linn. Soc. (Lond.), Vol. XV., p. 182, 1827; Gould, Synops. Birds Austr., pt. III., pl. 45, 1838; Gray, Genera Birds, Vol. I., p. 29, 1845; Gould, Birds Austr., Vol. I., pl. 19, 1848; Bonaparte, Consp. Gen. Av., Vol. I., p. 33, 1850; Gould, Handb. Birds Austr., Vol. I., p. 45, 1865; Ramsay, Proc. Zool. Soc. (Lond.) 1875, p. 579 (Q.); Chandler, Emu, Vol. XIII., p. 36, 1913 (Vict.); Orton and Sandland, *ib.*, p. 76 (W.A.); Macgillivray, *ib.*, p. 150, 1914 (Q.); Barnard, *ib.*, Vol. XIV., p. 41 (N.T.).

Astur torquatus Kaup, Mus. Senckenb., Vol. III., 1845, p. 259.

Nisus torquatus Kaup, Isis 1847, p. 181.

Accipiter cirrhocephalus Gray, Genera Birds, Vol. I., p. 29, 1845-9; Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 141, 1874; Gurney, Ibis 1875, pp. 468, 475; Ramsay, Cat. Austr. Acc., p. 19, 1876; *id.*, Proc. Linn. Soc., N.S.W., Vol. II., p. 177, 1878; Gurney, List Diurn. Birds of Prey, p. 38, 1884; Legge, Papers and Proc. Roy. Soc. Tasm. 1886, p. 237, 1887; Ramsay, Proc. Linn. Soc. N.S.W., Ser. 2, Vol. II., 1887, p. 166, 1887 (N.W.A.); *id.*, Tab. List Austr. Birds, p. 1, 1888; North, Austr. Mus. Cat., no. 12, p. 5, 1890; *id.*, Rep. Horn Sci. Exped. Centr. Austr., pt. II., p. 54, 1896 (Centr. A.); *id.*, Austr. Mus. Cat., no. 4, p. 20, 1898; Keartland, Trans. Roy. Soc. S.A., Vol. XXII., p. 165, 1898 (N.W.A.); Hall, Key Birds Austr., p. 4, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 9, 1901; Hall, Emu, Vol. II., p. 63, 1902 (N.W.A.); Hill, *ib.*, p. 161, 1903 (Vict.); Milligan, *ib.*, Vol. III., p. 16, 1903 (W.A.); Carter, *ib.*, p. 32 (W.A.); Hartert, Nov. Zool., Vol. XII., p. 208, 1905 (N.W.A.); Mathews, Handl. Birds Austral., p. 40, 1908; Sassi, Journ. für Orn., p. 365, 1909 (Q.); Gibson, Emu, Vol. IX., p. 72, 1909 (W.A.); Whitlock, *ib.*, p. 190, 1910 (W.A.); Ogilvie-Grant, Ibis 1910, p. 170 (W.A.); Littler, Handb.



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ACCIPITER CIRROCEPHALUS.

(COLLARED SPARROW HAWK).

Birds Tasm., p. 4, 1910 (Tasm.); Ingle, Emu, Vol. X., p. 122, 1910 (Vict.); Broadbent, *ib.*, Vol. X., p. 233 (Q.); North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 195, 1911; Barnard, Emu, Vol. XI., p. 21, 1911 (N.T.); Stone, *ib.*, Vol. XII., p. 113, 1912 (Vict.).

Accipiter melanops Strickland, Ornith. Syn., p. 111, 1855 (ex *Falco melanops* Latham 1801 not 1790).

Nisus cirrhocephalus Schlegel, Mus. de Pays-Bas, Vol. II., Astures, p. 38, 1862.

Uraspiza cirrhocephalus Kaup, Proc. Zool. Soc. (Lond.) 1867, p. 176.

Falco macrodactylus "Temm.," Gray, Handl. Gen. Sp. Birds, pt. I., p. 34, 1869: nom. nud.

Astur cirrocephalus cirrocephalus Mathews, Nov. Zool., Vol. XVIII., p. 246, 1912.

Astur cirrocephalus broomei Mathews, *ib.*, p. 247, 1912; Broome Hill, South-west Australia.

Accipiter cirrocephalus cirrocephalus Mathews, List Birds Austr., p. 104, 1913; White, Emu, Vol. XIV., p. 186, 1915 (Central).

Accipiter cirrocephalus broomei Mathews, List Birds Austr., p. 104, 1913.

Paraspizias cirrhocephalus Mathews *ante*.

DISTRIBUTION. Australia; Tasmania.

Adult male. Entire back, wings and tail dark slate colour, the bases of the feathers grey; head and sides of face dark plumbeous, paler on the throat where the feathers are barred with white; the flight-quills rather darker than the back with an indication of paler bars and white mottlings towards the base; middle tail-feathers similar in colour and markings, but the lateral ones paler and the bars more pronounced, a patch of chestnut on each side of the neck extending across the hind-neck where it forms a collar; the bases of the feathers on the nape white; under-surface rufous barred with white, including the axillaries and under wing-coverts, but the rufous paler and becoming grey on the long under tail-coverts. Bill dark horn, cere yellow, eyes golden-yellow, feet yellow. Total length 320 mm.; culmen 10, wing 208, tail 150, tarsus 59. Figured. Collected at Wilson's Inlet, South-west Australia, on the 10th of May, 1910.

Adult female. Similar to the adult male but larger; wing 242 mm., culmen 14, tarsus 61. Collected at the same place as the male on the 31st of May, 1910.

Immature female. General colour above dark brown, the feathers everywhere narrowly-edged with rufous, the feathers on the head and hind-neck having white bases; bastard-wing, primary-coverts and quills barred with paler brown and more or less notched with rufous on the inner webs; tail numerously barred with greyish-brown, and more or less rufous mottlings on the inner webs of the feathers; the feathers on the sides of the crown streaked with buffy-white, those on the hinder-cheeks and sides of neck more uniform brown, the space surrounding the eye covered with short dark hair-like feathers; chin and throat buffy-white with dark shaft-lines to the feathers, the dark portion much more extended on the fore-neck and breast where the feathers are margined with buffy-white; remainder of the under-surface white barred with dark rufous-brown; the dark markings on the under wing-coverts more rounded on the edge of the wing; quills and tail-feathers below silvery-grey with dark brown bars and tinged with cinnamon-rufous towards the base of the former and the inner webs of the latter.

North Australian birds are lighter throughout. Wing of male 196-203 mm. Female 229-233 (Queensland to North-west Australia).

Nest. A platform made of thin twigs (sometimes green) and lined with leaves.

Eggs. Clutch, two to four. Similar to those of the previous species but smaller. Bluish-white, with no gloss. Sometimes marked with spots or blotches of reddish-brown or lavender. Axis 37-39 mm.; diameter 29-30 (Queensland).

Breeding-season. September to December (East); July (West).

The early history of this bird is scant, as, although it was figured in the Watling Drawings No. 21, Latham confused it, as Watling had done, with the Goshawk, *Urospiza fasciata* Vigors and Horsfield.

Caley, however, sent a specimen with the following note: "The native name of this *Hawk* is *Bilbil.* It is a bold bird, and makes great havoc among chickens. I once witnessed it in the act of darting at a *Blue Mountain Parrot,* which was suspended in a cage from the bough of a mulberry-tree within a couple of yards of my door. The *irides* are yellow. The length of the male is 12½ inches, of the female 14½."

This specimen was determined by Vigors and Horsfield as *Falco torquatus* Cuv. as figured by Temminck, and it became known as *Accipiter torquatus.* Later Temminck's bird was shown to be an *Astur* from Timor; it was also found that Vieillot had given the name *Sparvius cirrocephalus* to the description drawn up by Latham from the above-mentioned Watling Drawing. Thus, in the *Gen. Synop. Suppl.*, p. 51, 1801, Latham described the New Holland Sparrow-Hawk from the Watling Drawing without admission or recognition of the fact. He, however, did not give it a Latin name, but referred it to *Falco nisus* as var. δ. Vieillot recognised the description as inapplicable to *Falco nisus,* and therefore proposed to distinguish it as above, simply translating Latham's description. Since Caley's time few notes have been made concerning the life-history of this bird, which is therefore comparatively unknown.

Captain S. A. White, writing from South Australia, simply notes: "Not a common bird in South Australia, but occasionally seen in pairs and very swift in flight. It seems to prefer the open timbered country to the plains."

Gould wrote: "In its habits and disposition it has all the characteristics of its European ally the *Accipiter nisus,* whose boldness and daring spirit while in pursuit of its quarry have been so often described that they are familiar to everyone; the sexes also exhibit the same disparity in size, the female being nearly as large and powerful again as her mate: hence the Quails and the numerous species of Honey-eaters find in her a most powerful enemy. For rapidity of flight and unerring aim, however, she is even surpassed by her more feeble mate, who may frequently be observed at one moment skimming quietly over the surface of the ground, and the next impetuously dashing through the branches of the trees in fearless pursuit of his prey, which, from the quickness of his abrupt turns, rarely eludes the attack." (*Handb. Birds Austr.*, Vol. I., p. 33, 1865.)

Mr. Thos. P. Austin has written me from Cobbora, New South Wales: "Only upon three occasions have I seen this species in this district and each time they were nesting, and using an old nest of *Haliastur sphenurus*: the first one I found, although I flushed a bird from it, contained no eggs; owing to being busy with shearing I did not have time to visit it again for about three weeks, when the nest contained four young, which did not appear to be more than a few days old: they were covered all over with a light chocolate-brown down. The birds when sitting are very difficult to flush from their nests."

As usual, full accounts of its nesting habits are given in the *Austr. Mus. Spec. Cat.*, no. 1, Vol. III., p. 195-8, 1911, and from that source I extract the following notes:

Mr. G. Savidge, from the Upper Clarence River, New South Wales, observed: "The Collared Sparrow-Hawk is fairly common throughout the Clarence River District, and is a much smarter bird than the Goshawk, and it is not such a troublesome bird to the settlers as the latter. A pair nested in a tree close to a farmer's place here for many years, using the same nest each season until it was blown down by a gale of wind. It was on a thin limb of a Bloodwood-tree, and out of reach of the most expert climbers: it removed and constructed its nest in an apple-tree close by. . . . Although this bird had young for so many years in such close proximity to the fowls and chickens, it was never known to molest them in any way." Mr. Robert Grant added: "The Collared Sparrow-Hawk is sparingly distributed over the Blue Mountains, New South Wales, and is generally met with in the valleys or flats. During flight it is remarkably quick in its movements, and is usually seen about six or eight feet from the ground gliding in and out of the trees, and it has often surprised me that it does not come in contact with them. It is very destructive to small birds, and I have seen one strike and secure a Yellow-breasted Robin (*Eopsaltria australis*) without apparently lessening its speed in any way. Of the many I have shot, the stomachs of nearly all of them contained the remains of small birds." Mr. Malcome Harrison, from Hobart, Tasmania, wrote: "Although the Sparrow-Hawk is so comparatively common, its eggs are difficult to obtain and I know of very few sets obtained locally. Those I have seen are well coloured. Personally I have not come across more than two or three nests, and those were practically inaccessible. When living at New Town, some years ago, I saw from my window a Sparrow-Hawk strike down a Sparrow and proceed to devour it on the old stump of an apple-tree, within a yard of the verandah, and even when I appeared outside no fear was evinced, and the bird only took wing when I was within a few feet of it."

As against Mr. Savidge's account of its harmlessness may be noted Dr. Lonsdale Holden's fear as expressed in the note from Tasmania: "I shot a Sparrow-Hawk out of my bedroom window at Bellevue, on the 9th March, 1901, which was eyeing some chickens in my garden." It should be noted, however, that it had not taken any chickens, nor is there any accusation against this bird as against the Goshawk."

Stone, *Emu*, Vol. XII., p. 113, writing from Lake Boga, Victoria, notes: "Rare. In the Charlton district, years ago, I was staying at a friend's house, several of the doors of which opened on to a verandah. Chancing to open the dining-room door to see the time, I felt my hair disturbed by the flight of a bird past my head into the room, but before I had time to shut the door the bird flew out again. I saw it was a Sparrow-Hawk with a young Parrot in its talons, and closely pursued by the parent of the Parrot, which was so persistent in its attack that the Sparrow-Hawk sought refuge in another room, where it was caught: but by this time both Parrots had escaped."

Keartland, in the *Rep. Horn. Sci. Exped. Centr. Austr.*, pt. II., p. 54, 1896, gives the following note: "Whilst camped for lunch near Deep Well our attention was attracted to a pair of those birds as they flew about overhead and occasionally pounced upon one of the numerous small birds near the water. As they turned in the air, the bright sun shining on their backs gave them a very handsome appearance, and it was not until one had been shot that we were satisfied as to its identity."

The subspecies of this bird are not well defined, but they are not in such a perplexing state as those of the preceding species, though the coloration is somewhat alike. Thus, though the scheme is exact, the shades do not follow in the same localities, which is a valuable item and may lead to the truth later.

In my "List" (p. 104) I admitted two forms, thus:

A. c. cirrocephalus. East Australia.
A. c. broomei. West Australia; Northern Territory.

The latter I had previously separated from Broome Hill, South-west Australia, on account of its darker coloration.

A careful study of the series available leads me to revise that view and to indicate three races, but more material is necessary to determine the limits of the races.

Thus the typical form ranges from South Queensland, through New South Wales, Victoria and Tasmania, to South Australia. To the north and north-west a form occurs which may be called:

Accipiter cirrhocephalus quaesitandus, subsp. nov.

The type is from Cape York, North Queensland, 4th July, 1912, and the range would be North Queensland, Northern Territory, and North-west Australia, with perhaps the interior districts of Mid-west Australia. All the birds so far received from these places are paler throughout and may average smaller. I am not laying stress upon detailed measurements in this class and will discuss the reasons later. The variation in age and plumage makes accurate data impossible to prepare at the present time.

An interesting form is the New Guinea one described by Rothschild and Hartert (*Nov. Zool.*, Vol. XX., p. 482, 1913, Oct. 21) as *Astur cirrhocephalus papuanus*. This bird is darker than the typical form, and not lighter as the Cape York birds are.

Four forms may thus be doubtfully recognised.

Accipiter cirrhocephalus cirrhocephalus (Vieillot). East Australia from South Queensland to South Australia.

Accipiter cirrhocephalus quaesitandus Mathews. North Queensland, Northern Territory and North-west Australia.

Accipiter cirrhocephalus broomei Mathews. South and Mid-west Australia.

Accipiter cirrhocephalus papuanus (Rothschild and Hartert). New Guinea.

The following notes given me by Mr. Tom Carter refer to the Western form: "The Sparrow-Hawk is not so common as the Goshawk, but distributed over the whole of the state. Three eggs were found in a nest on the Gascoyne River, July 23rd, 1887. The nest was about twenty feet from the ground in a white gum-tree and was flat in shape. On October 20th, 1910, at Broome Hill, after several times seeing a Sparrow-Hawk leave its nest, which was built twenty-five feet from the ground near the end of a pendant branch of a white gum-tree, I knocked the nest down on to a blanket suspended below it to catch the eggs, but there were no eggs. These birds are very destructive to young chickens, and one killed a canary in its cage, in the shade of the verandah at Wensleydale this winter. I have seen them kill *Glossopsittacus porphyrocephalus* on more than one occasion, although these lorikeets are very swift fliers."

Here we see the deliberate accusation of this bird as a chicken-killer in the West. I have not the least doubt myself that the habits of birds are more quickly changed than their coloration, etc., so that in the majority of cases subspecies will have slightly different habits. Of course, chicken-killing has nothing to do with subspecific differentiation, as it is more or less an artificial habit and would depend upon the plenitude of food and the nature of the individual Hawk. In the case of the Goshawk, it has become a fixed habit through that bird's comparative laziness, whatever this may be due to.

The two following notes also refer to Western birds, but while the former is certainly applicable to *broomei*, the latter would perhaps be better placed under *quaesitandus*, as the birds I have examined from the interior of West Australia are pale birds.

Milligan, in the *Emu*, Vol. III., p. 16, 1903, noted during a trip to the Stirling Ranges, West Australia: "One morning in the vicinity of Yetermirrup Spring, I observed one of these winged hunters scouring a gully. He was flying at a terrific pace, just about two feet above the rough ground herbage. His turnings, where patches of scrub and other natural obstacles intercepted a straight flight, were particularly graceful. Evidently his reputation had preceded him, and his flight was observed, judging by the way the Honey-eaters and other small birds sounded the alarm note of danger. By the same means the course of his subsequent flight could be traced half a mile further away."

Whitlock, writing on the birds of East Murchison (*Emu*, Vol. IX., p. 190, 1910) stated: "Scattered pairs are to be found throughout the district, breeding in suitable haunts. Near Milly Pool I found three nests—the first a very well constructed nest in a beef-wood tree. All the material was entirely new and neatly put together. The cup was shallow, but for all that profusely lined with green eucalypt leaves. The female sat close, and I could not see from below. On climbing the tree I found four beautiful eggs, well marked, but with the blotches pale rufous, in which characteristic they differ from eggs of the European Sparrow-Hawk which they otherwise resemble. A second nest was a rough untidy structure, probably the old nest of some larger Hawk, but like the last, the egg cavity was neatly lined with fresh eucalypt leaves. This nest contained three fresh eggs, quite spotless, and almost white in ground colour. I was very unwell at the time, and in coming down the tree got caught on a snag, breaking two of the eggs. My third nest was in a very large casuarina, and was again an old nest re-lined. I took it probably before the clutch was completed. It contained but two fresh eggs."

The note by Keartland, as here reproduced, given in the *Trans. Roy. Soc. S.A.*, Vol. XXII., p. 165, 1898, would belong to *A. c. quaesitandus*: "Along the Fitzroy and Margaret Rivers and their branches these bold little birds were met with. Near our camp, in January, I was surprised to see a small male bird attacking a pair of Rose-breasted Cockatoos. The Cockatoos had selected the hollow branch of a tree for their nest, and whilst they were trimming the entrance to their future domicile, the Hawk made frequent swoops at them, knocking out bunches of feathers and causing the Cockatoos, which were more than twice his weight, to cry out with pain. This battle was continued for some time, and was eventually terminated with a cartridge, as I hoped to have the chance of robbing the Cockatoo's nest myself."

Macgillivray (*Emu*, Vol. XIII., p. 150, 1914) simply notes: "Seen several times on Cloncurry and Leichhardt Rivers. At Cape York, on 24th November, 1910, a nest of this species was found containing three fully fledged young birds, in a Moreton Bay ash. The birds were not at all common."

A note should be given concerning *Falco melanops* Latham, as in the synonymy will be noted *Accipiter melanops* Strickland, *Ornith. Syn.*, p. 111, 1855.

In the *Index Ornith. Suppl.*, p. xii., 1801, Latham named *F(alco) melanops*, based on the Black-eyed Falcon, *Gen. Syn. Suppl.*, II., p. 52. This name was founded on a drawing, and the following notes will explain the matter. In my *List Birds Austr.*, p. 327, 1913, in Appendix B, I wrote: "This was determined by Strickland as having been based upon a drawing which he recognised as that of *A. torquatus* Temm., and in the Ornithological Synonyms he displaces that by Latham's species name." Earlier in the *Nov. Zool.*, Vol. XVIII., p. 246, 1912, I had explained: "*Falco melanops* Latham, *Index Ornith. Suppl.*, p. xii., 1801, New South Wales, may be referable to this species; but in any case it is unavailable, being preoccupied by the same author (*Index Ornith.*, p. 37, 1790)."

GENUS—ERYTHROTRIORCHIS.

ERYTHROTRIORCHIS Sharpe, Proc. Zool. Soc. (Lond.) 1875 (Aug.), p. 337 .. .. Type *E. radiatus.*

SMALL Aquiline birds with short bills, long wings, long tail, short stout legs and strong feet.

The heavy build of this bird has caused trouble with regard to its systematic location, and until careful anatomical examination is made it will remain a puzzle.

It was referred to *Astur*, but Sharpe in 1874 referred it to the Buteoninæ under the name, used generically, of *Urospizias.*

Sharpe's definition of his subfamily Buteoninæ (*Cat. Birds Brit. Mus.*, Vol. I., p. 158, 1874) reads: "Outer toe only connected to middle toe by interdigital membrane; tibia much longer than tarsus, exceeding it by more than the length of hind-claw.

"I have done my utmost to secure the exact relative dimensions of these two bones, but the scantiness of osteological material renders positive identification in many cases impossible. At any rate, the probability that some genera placed by me among the Buteoninæ may some day be found to belong to the Accipitrinæ only proves the truth of Professor Sundevall's remark that the two subfamilies are hardly separable (*Av. Tent.*, p. 107)."

Sharpe's definition of his subfamily Accipitrinæ may be here given as a contrast (p. 46).

"Outer toe connected to middle toe by an interdigital membrane; tibia and tarsus to all intents equal in length, the difference between them not so great as the length of hind claw."

Such a distinguishing character would never have occurred to me, as it must be so obviously artificial. I would have ignored even the criticism of such a valueless feature, but as the refutation of the diagnosis as applicable to the present species has been published, I here quote it.

Austr. Mus. Cat, no. 4, gives the following data:

p. 19. Adult male. Tibia 3.94, tarsus 3, hind claw along the curve 1.35, across the curve 1.15 inch.

p. 20. Adult female. Tibia 4.34, tarsus 3.3, hind claw along the curve 1.8, across the curve 1.4.

ERYTHROTRIORCHIS.

A note is given to the effect that the "measurements have been taken with the ends of the bones laid bare."

On this account the bird has been placed near or in *Astur*, but commonly *Erythrotriorchis* has been generically used. I regard this genus as nearer *Astur* than *Buteo*, but again emphasize the fact that here the personal equation is unreliable, and recourse to anatomy is the only sure guide.

The bill is short with a small cere, the nostril is somewhat rounded and open, not hidden by the loreal bristles.

The wing is long, with the third, fourth and fifth primaries subequal and longest, the fourth slightly exceeding the others: the second primary is shorter than the sixth, and the first subequal but usually shorter than the seventh.

The tail is long, but is just about three-fifths the length of the wing.

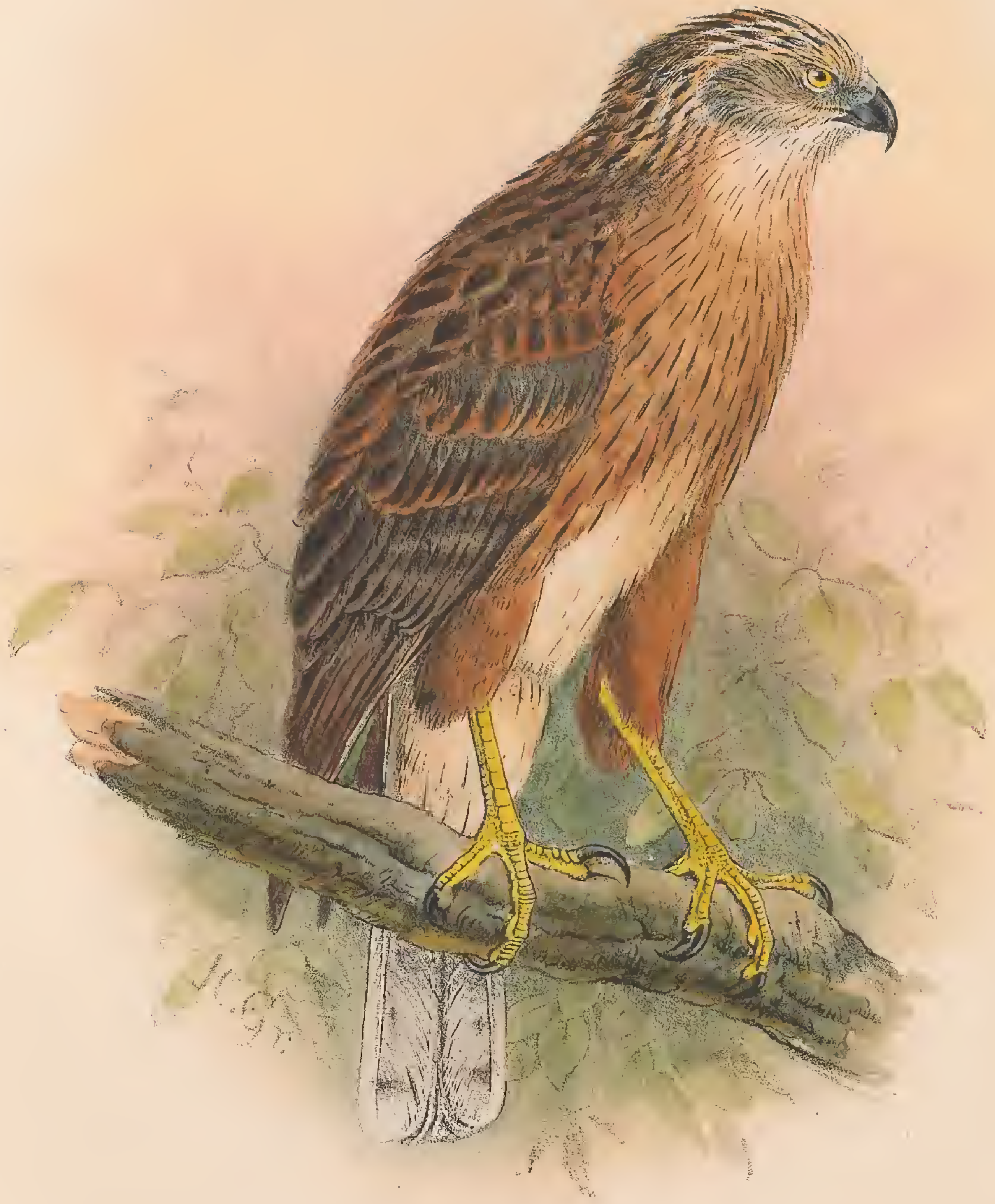
The legs and feet are very stout and strong: the tarsus is about one-third the length of the tail. In front it is regularly scutellated, and behind it is reticulated just as in *Astur*, but here no fusion is shown in the adult. The toes are stout and normal and the claws are long: the foot is well figured in the *Emu*, Vol. X., pl. opposite p. 251, 1911, and I have also given a figure, *antea* p. 55.

In my "List," as a synonym of *Erythrotriorchis* I included *Megatriorchis*, following Sharpe, Rothschild and Hartert and an examination of a bird so named in the British Museum. This synonymy is incorrect, as shown by Rothschild and Hartert in the *Nov. Zool.*, Vol. XXII., p. 51, Feb. 12, 1915, under the heading *Megatriorchis doriæ*, thus: "This genus was separated on account of its short rounded wings, the very small difference in length between primaries and secondaries, and the long tail; in the original diagnosis is a misprint, 'remigibus primaries paulo brevioribus' instead of 'paulo longioribus': this is evident from a look at the bird and from Salvadori (*Orn. Pap.*, Vol. I., p. 42). Later on Sharpe united *Megatriorchis* and *Erythrotriorchis*, but we cannot accept this alteration; it was done on the strength of a bird which Sharpe wrongly identified with *M. doriæ*, and which we were obliged to describe as a new species. In the typical *Erythrotriorchis* (type *E. radiatus*) the wings are much longer, the distance between the longest primaries and secondaries considerable, viz., 11-13.5 cm. as against 25-35 mm.! in *Megatriorchis*. The tail in *Erythrotriorchis* is shorter, and more even in *Megatriorchis*, so that the bird has altogether a very different appearance."

As Rothschild and Hartert are genus-lumpers, I at once agree in the recognition of *Megatriorchis* as a distinct genus. It is worth notice that in the *B.O.U. List of British Birds* a genus admitted by Hartert, *Herbivocula*, is suppressed: in view of the wide limits given by Hartert to genera such a conclusion is remarkable, and examination of the bird proves Hartert absolutely right and the B.O.U. Committee quite wrong. Convenience cannot be justly urged as a valid reason for such action, as it *must* be very inconvenient to an earnest worker to find a bird in a genus in each characteristic of which it obviously differs.

When Rothschild and Hartert separated the bird wrongly confused by Sharpe with *Megatriorchis doriœ* they referred it to *Accipiter* (*Astur*). I cannot understand how Sharpe ever mixed the two species up, as they are so very different in coloration as well as in structural proportions. I suppose the change in coloration from immature to adult in the genus *Urospiza* prejudiced him, but then the wing formation should have set him thinking. However, how a bird with a wing formula like *Accipiter* (*Astur*) *eudiabolus* (for that is the very appropriate name Rothschild and Hartert applied to the bird confused) could be expected to develop into one with the wing formula of *Megatriorchis doriœ* is quite beyond my comprehension. Personally I do not see that reference to *Erythrotriorchis* solved the matter, which is extraordinary, as that genus was proposed by Sharpe himself.

Examination of specimens of the true *Megatriorchis* causes me to suggest that they are not closely allied to the *Erythrotriorchis*-*Astur* group, admitting that *Erythrotriorchis* is allied to *Astur*: or further that *Megatriorchis* has not its nearest relatives in either *Erythrotriorchis* or *Astur*.



H. Grönvold. del.

Witherby & Cº

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ERYTHROTRIORCHIS RUFOTIBIA.

(RED-THIGHED GOSHAWK).

Order FALCONIFORMES *Family AQUILIDÆ.*

No. 297.

ERYTHROTRIORCHIS RADIATUS.

RED GOSHAWK.

(PLATE 240.)*

FALCO RADIATUS Latham, Index Ornith., Suppl., p. xii., 1801 : New South Wales.

Radiated Falcon, Lath., Gen. Synops. Birds, Suppl. II., p. 53, pl., 1801.

Falco radiatus Latham, Index Ornith., Suppl., p. xii., 1801; Vieillot, Nouv. Dict. d'Hist. Nat., Vol. X., p. 340, 1817.

Haliæëtus calei Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 186, 1827 : New South Wales.

Nisus radiatus Lesson, Manuel d'Orn., Vol. I., p. 97, 1828.

Astur radiatus Gray, Ann. Mag. Nat. Hist., Vol. XI., p. 189, 1843 ; Gould, Birds Austr., Vol. I., pl. 16, 1848 ; Gray, Genera Birds, Vol. I., p. 27, 1845 ; Bonaparte, Consp. Gen. Av., Vol. I., p. 31, 1850 ; Gould, Handb. Birds Austr., Vol. I., p. 40, 1865 : Gray, Handl. Gen. Sp. Birds, pt. I., p. 29, 1869 ; Ramsay, Cat. Austr. Acc., p. 16, 1876 ; *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 177, 1878 ; *id.*, *ib.*, Ser. 2, Vol. I., p. 1141, 1887 (Q.) ; *id.*, Tab. List Austr. Birds, p. 1, 1888 ; North, Austr. Mus. Cat., no. 12, 1890, p. 380.

Accipiter radiatus Gould, Ann. Mag. Nat. Hist., Vol. XI., p. 335, 1843.

Astur testaceus Kaup, Isis 1847, p. 367 ; New South Wales.

Urospizias radiatus Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 159, 1874 ; Gurney, Ibis 1875, p. 364 ; *id.*, *ib.*, 1876, p. 65 ; Hall, Key Birds Austr., p. 5, 1899 ; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 10, 1901.

Erythrotriorchis radiatus Sharpe, Proc. Zool. Soc. (Lond.), Aug. 1875, p. 337 ; Gurney, Ibis 1876, p. 65 ; *id.*, List Diurn. Birds Prey, p. 45, 1884 ; North, Austr. Mus. Cat., no. 4, p. 18, 1898 ; Mathews, Handl. Birds Austral., p. 40, 1908 ; Hill, Emu, Vol. X., p. 266, 1911 (N.W.A.) ; Mathews, List Birds Austr., p. 105, 1913 ; Macgillivray, Emu, Vol. XIII., p. 150, 1914 (Q.) ; Barnard, *ib.*, Vol. XIV., p. 41, 1914 (N.T.).

Erythrotriorchis rufotibia Campbell, Emu, Vol. X., p. 249, Jan. 21, 1911 : Napier Broome Bay, North-west Australia ; Hill, *ib.*, p. 266.

Astur radiatus radiatus Mathews, Nov. Zool., Vol. XVIII., p. 247, 1911.

Astur radiatus rufotibia Mathews, *ib.*

DISTRIBUTION. New South Wales ; Queensland ; Northern Territory ; North-west Australia.

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* The Plate is lettered *Erythrotriorchis rufotibia*.

Adult male. Upper-parts dark brown, the feathers margined with rufous, more conspicuously on the upper wing-coverts, and the bases of the feathers grey; bastard-wing and primary-coverts dark brown broadly-barred with greyish-brown, the primary and secondary-quills similar but paler and mottled with white on the basal portion of the inner webs, the shafts of the primary-quills straw-colour; the third, fourth, fifth, and sixth primary-quills incised on the outer webs and the first to the fifth on the inner webs; some of the upper tail-coverts broadly tipped with rufous; tail greyish-brown with dark spots or obsolete bars, the subapical one being much broader; crown of head dark brown with rufous-buff margins to the feathers; the occipital crest blackish with white bases to the feathers; fore-head, a broad line over each eye, sides of face and throat dull white with dark hair-like shaft-lines to the feathers; breast, sides of body, axillaries and under wing-coverts rufous with dark shaft-streaks and an infusion of grey on the feathers of the breast; abdomen and under tail-coverts more or less mixed with rufous; thighs uniform rufous; the marginal under wing-coverts much paler than the inner ones, the greater series grey with dark centres towards the tips; lower aspect of quills and tail-feathers grey with irregular dark markings. Bill black, cere grey, eyes yellow, feet and legs light yellow. Total length 490 mm.; culmen 30, wing 350, tail 210, tarsus 74. Figured. Collected on the Katherine River, Northern Territory, on the 25th July, 1895.

Adult female. Differs from the adult male in having the breast much whiter and in being larger. Wing 405 mm., culmen 35, tail 250, tarsus 84. Collected in North-west Australia.

In a pair from Queensland the female differs in having the under-parts not so white as in the female described, and the adult male differs from the male described in having the white of the under-parts reduced to a narrow line on some of the feathers. Female: wing 417 mm., culmen 37, tarsus 87. Male: wing 360 mm., culmen 27, tarsus 77.

Immature ?. All red underneath as described by North.

Nestling. Seems to be undescribed.

Nest. A large structure made of sticks and lined with leaves.

Eggs. Clutch two; bluish-white (sometimes with a few smears), with no gloss. Axis 56 mm., diameter 45. (Queensland.)

Breeding-season. August to November.

Latham, in the *Index Orn. Suppl.*, p. xii., 1801, introduced *F(alco) radiatus* for the bird described in the *Gen. Synops. Suppl.*, Vol. II., p. 53, and a full plate picture was given. After the description the following note was given: "This inhabits *New Holland,* but is probably a scarce species, only one having been met with, which was found nailed to the side of a barn."

Latham's description was drawn up from the Watling Drawings, where two paintings occur. Sharpe, in the *Hist. Coll. Nat. Hist. Brit. Mus.*, Vol. II., p. 110-111, 1906, observes this and copies the notes given by Watling as follows: "This bird measures from the top of the head to the end of the tail 22 inches, and from the tip of one wing to the other 4 feet; iris doubtful: a new Falcon." And again: "The skin of this bird I found nailed up to a settler's hut. It is the only one of the kind ever seen. The drawing is a faithful copy. The settler who shot it says the iris was brown, and remarked that he never saw any bird fly with such swiftness. Its claws, which were long, small, and sharp when he took it up, it drove quite through the ends of his fingers. A new Falcon. This bird measures from the bill to the extremity of the tail 24 inches."

When Vigors and Horsfield made their historic study of the Australian birds in the collection of the Linnean Society, they recognised *Falco radiatus* Latham as applicable to the young of the bird now known as *Urospiza fasciata,* and as a bird of the present species was preserved in that collection it was re-named by these authors *Haliæëtus calei.* When the Lambert Drawings were examined by Strickland, Gray and Gould, the error was discovered and rectified. Gould afterwards wrote: "This bird, which at the period of my visit to Australia was only contained in the Linnean Society's collection, is still very rare in the museums of Europe. It inhabits the dense brushes bordering the rivers Manning and Clarence on the eastern coast of New South Wales, and that it enjoys a much greater range is more than probable. It is the largest of the Goshawks inhabiting Australia, the female nearly equalling in size that of the *Astur palumbarius* of Europe. In some parts of its structure the Radiated Goshawk differs considerably from the typical Asturs, particularly in the lengthened form of the middle toe, in which respect it resembles the true Accipiters; in its plumage it differs somewhat from both those forms, the markings of the feathers taking a longitudinal instead of a transverse direction. These and other slight differences may hereafter be considered of sufficient importance to warrant its separation into a distinct genus, but for the present I have retained it in that of *Astur.* Of its habits and economy nothing whatever is known."

The last sentence can practically be endorsed, as it is a rare bird, and though its eggs are known, little else has been added.

I have received no notes about this, and Campbell quotes Barnard's discovery of the eggs, while North in the *Austr. Mus. Spec. Cat.,* no. 1, Vol. III., p. 198-200, 1911, has only more notes by Barnard. The following notes are taken from North, who called it the Rufous-bellied Buzzard, and wrote: "With the exception of *Astur cruentus* (this was a myth) the present species is the rarest of all our Australian Accipitres. In the *Catalogue of the Birds in the British Museum* Dr. Sharpe enumerates specimens from Port Essington, in the Northern Territory of South Australia, presented by Captain Chambers, R.N.; another received from Gould, which was procured at Bourke, Darling River, New South Wales, and the type of *Haliætus caleyi,* described by Vigors and Horsfield in the *Transactions of the Linnean Society of London,* and who quoted the following note of

Caley's: 'It frequents the upper parts of the Harbour (Port Jackson), particularly about the flats, a few miles below Parramatta. The natives tell me it feeds upon dead fish, and the bones which they leave. The flats is a noted fishing place for the natives; the water there is shallow, and at ebb tide a great portion of sand is left bare, which, with some marshy land adjoining, forms a convenient resort for several species of birds.' The specimens in the Australian Museum Collection were obtained at Cooktown and Cairns, North-eastern Queensland, at the Dawson River, and Wide Bay in the same State, and a male procured in the Richmond River District, New South Wales."

I have quoted this in full as there are some points which require notice. I have shown that *Astur cruentus*, as understood by North, was a myth, so that this must be the rarest Australian Falconiform bird. Sharpe, in 1875, added the record that two more specimens had been received from Mr. J. B. White from the Interior of Queensland, *and since that date no specimens have been added to the British Museum Collection.* The note given by North as of Caley *does not refer* to this bird, but to *Haliæëtus canorus* of Vigors and Horsfield, which is the same as *Haliastur sphenurus* (Vieillot). No note whatever is given by Vigors and Horsfield in connection with the present species.

The history of the nesting of the species as given by North reads: "In 1883 the late Mr. George Barnard forwarded the skins of this Buzzard to Dr. E. P. Ramsay, of the Australian Museum, for the purposes of identification, and in September of the following year sent him for description one of a set of two eggs taken that month. . . . His son obtained another nest on the 27th August, 1889. . . . A rather singular occurrence took place about the Radiated Goshawk's nest: when my sons found it there were two eggs in it, and one of them shot the male; about a month after, being up that way again, one of them climbed the tree and found another egg in this nest, laid after the first eggs were taken and the male bird shot. . . . The son, Mr. H. G. Barnard, wrote: 'I have only taken two nests of *Astur radiatus.* The first I found one day when out riding near a large swamp: my attention was attracted by hearing the loud cries of a White Cockatoo (*Cacatua galerita*). I rode over to the place, and when I arrived there a male *A. radiatus* flew off the ground, leaving the body of a freshly-killed Cockatoo. On looking about I saw the nest in a large Moreton Bay Ash, and on hitting the tree the female flew off. Not knowing the species I did not go up, but rode up next day with my brother Charlie, when we shot both birds; I then went up the tree and obtained the eggs. . . . In the second nest were also the hind legs and tail of a Frilled Lizard—the rest had evidently been eaten. One day, near the lagoon at Coomooboolaroo, a flock of Wood Ducks (*Chenonetta jubata*) was feeding in the grass about thirty yards from me, when I saw an *Astur radiatus* approaching, and it was also observed by the Ducks, which at once made a dash for the water. Like a flash the bird of prey was among them, striking down and killing one before they reached the margin of the lagoon. . . .' Subsequently Mr. Barnard reported the finding of another nest on the 3rd October, 1893, with two recently-hatched young, but in March, 1907, he recorded: '*Astur radiatus* has entirely left this district; I have not seen one for many years.' "

Mr. E. D. Barnard, in the *Emu*, Vol. II., p. 99, 1902, wrote: "On the 18th of March I got a cheap duck. I had been putting horses into a paddock. In the adjoining paddock there were 20 or 30 Wood Ducks feeding. Suddenly they flew into the water. Looking to see the cause of their alarm, I saw one Duck quacking and making for the lagoon, with a Hawk running at her side and holding on to her neck. She got nearly to the water and then fell over. I waited till the Hawk started plucking her and then went over. The Hawk flew away, and I took charge. As far as I could make out it appeared to be a Radiated Goshawk. He must have been a new hand at the game, for he picked a thin Duck."

There are too few specimens available to determine whether subspecies can be defined, but if so there is a name available, as will be noted hereafter.

In the *Nov. Zool*, 1912, I referred the species to *Astur* and admitted the North-western bird, as it had been described as a valid species by Campbell. In my "List" in 1913 I rejected the reference to *Astur* and also suppressed Campbell's name altogether. I have discussed the genus name and would comment upon North's reference of it to the Buteoninæ and his use of the vernacular Buzzard. There is no valid reason for such usage, though I do not deny that it may later be proved to be nearer *Buteo* than *Astur*. At the present time the usage of the genus *Erythrotriorchis* is imperative, but the vernacular is doubtful.

As noted above, the receipt of specimens from North-west Australia caused Campbell, ignorant of its plumage-changes, to describe it as a new species. I am quite unable to even appreciate subspecific differences, but hereafter give all that has been written about the North-western bird. The reference to *Megatriorchis* I have already noted under the generic headings.

This bird is so rare and little known that when an adult female was procured at Napier Broome Bay, North-west Australia, in 1910,

A. J. Campbell described in the *Emu*, Vol. X., Jan. 21, 1911, a "New Goshawk" with the remarks: "This large and handsome new Goshawk is the second of the genus found in Australia, the other being the Red Goshawk (*Erythrotriorchis radiatus*), and is closely allied to the Marquis Doria Goshawk (*E. doriæ*),* found in New Guinea, but from which the Australian bird differs chiefly by its lighter coloration, the absence of dark spots on the under tail-coverts, and by the very distinct and uniform-coloured (rufous) thighs (tibia)." * The footnote with regard to *E. doriæ* reads: "Of Salvadori and D'Albertis. For figures see Gould-Sharpe's *Birds of New Guinea*, Vol. I., pl. 2, concerning which Dr. Sharpe wrote: 'The original specimen came from Hall Bay, in south-eastern New Guinea. There is the bird which forms the principal figure in the plate, and which we consider to be immature. The second specimen figured in the plate is apparently a fully adult bird, and was obtained by Mr. Goldie on the Astrolabe Mountains, in south-eastern New Guinea. We believe it to be an adult male, and the type to be an immature female, notwithstanding some discrepancies in the proportions of the quills and tail-feathers exhibited by the two specimens. If we are correct in thus assuming the relation of these two individuals, then it is evident that the genus *Megatriorchis* is the same as the Australian genus *Erythrotriorchis*, of which *E. radiatus* is the representative species on the latter continent. A larger number of specimens is, however, requisite to settle the point satisfactorily.'"

The "discrepancies in the proportions of the quills and tail-feathers" which Dr. Sharpe refers to is so great in my opinion, that the two birds discussed are abundantly distinct generically, and even Rothschild and Hartert have now admitted this.

The plumage described by Campbell was not, however, even new, as, though North consistently wrote "female like male but larger," and described the male as rufous below, when Sharpe introduced the genus *Erythrotriorchis* he described in detail a bird agreeing with Campbell's description.

When Hill gave his field-notes about the new bird in the same place (*Emu*, Vol. X., p. 266), he wrote:

"*Erythrotriorchis radiatus* (Red Goshawk). A single specimen was secured.

"*Erythrotriorchis rufotibia* (Red-legged Goshawk).

"I saw four only of these new and fine Goshawks. On 1/5/10 a pair took possession of the nest referred to under *Hieracidea orientalis*, to which they added a few sticks and a lining of green cajuput leaves. They were not seen again until the middle of June, and then only occasionally flying at a great height.

"On 30th June a bird was noticed on the nest for the first time, and on the following day a single egg was secured, the shell of which was already chipped, but I managed to save it. Mr. White describes it thus: Shape, round oval; colour, dirty white, without markings; shell rather coarse, and shows slight gloss; dimensions 2.16 × 1.73 inches. As the nest had been examined at a distance almost daily since the beginning of May, and the sitting bird was not noticed until the end of June, I feel sure that the process of incubation was carried on by the heat of the sun during the day and by the birds only at night. The female bird was secured on 30th June, and by the 20th July the male had mated again and commenced a new nest in a tall cajuput, about 50 yards distant from the first nest. All attempts to procure the male failed.

"Measurements of birds in mm.:

	Total length.	Wing.	Tarsus.	Bill.	Tail.
♀ ..	552	390	75	—	250
♀ ..	570	380	78	30	240."

Notes on this rare bird are so scant that the following recent ones should be collated. Macgillivray (*Emu*, Vol. XIII., p. 150, 1914) wrote: "Noted on many occasions at both Sedan and Byromine. One that was shot for a specimen was eating a Galah at the time. This species also came under notice on the Leichhardt and Gregory Rivers."

Barnard, writing of the birds of the M'Arthur River, Northern Territory (*Emu*, Vol. XIV., p. 41, 1914), stated: "Only a few of these fine birds were seen. A nest found early in September contained one hard-set egg. A second nest, with two fresh eggs, was found a few days later, and under this nest lay the remains of a Nankeen Night-Heron. On visiting the nest exactly four weeks later, two fine eggs, evidently laid by the same pair of birds, were taken. While I was taking the eggs the male bird brought a Naked-eyed Partridge-Pigeon (*Geophaps smithi*) with which to feed his mate."

GENUS—UROAËTUS.

UROAËTUS Kaup, Classif. Saugeth. Vögel, p. 121, 1844 .. Type *U. audax*.

Also spelt—

Uraëtus Kaup, Mus. Senckenb., Vol. III., p. 260, 1845.

LARGEST Aquiline birds, with comparatively small bill, long wings, long wedge-shaped tail, and short feathered legs and strong feet.

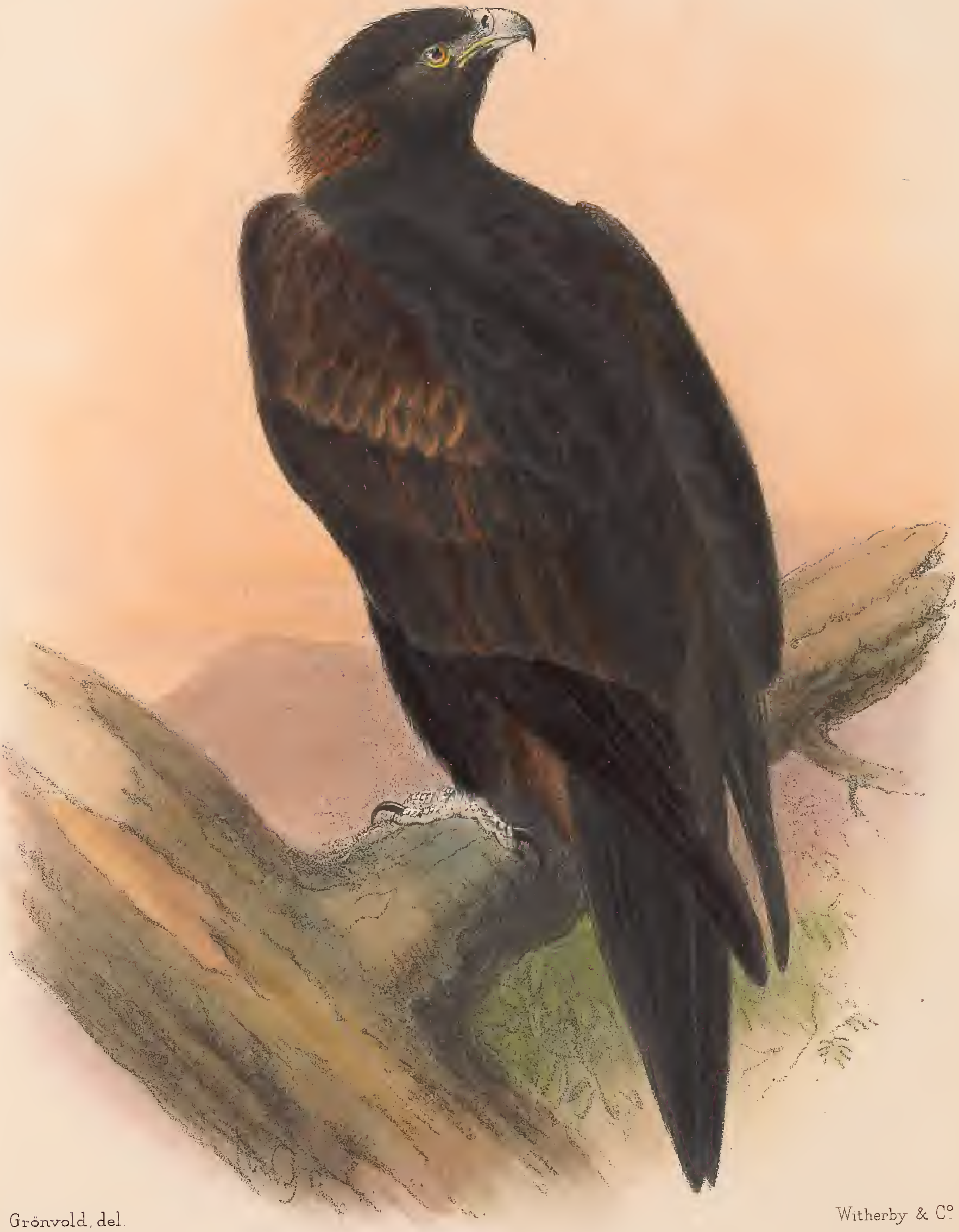
The bill is moderately curved, the hook long and perpendicularly descending, the lower edge of the upper mandibles scarcely sinuate; cere comparatively small: nostrils rather perpendicularly oval with an internal bony obstruction.

The wing is very long, the primaries strongly emarginate; the fourth is longest, the third and fifth subequal and little less, the first shorter than the seventh.

The tail is long, about two-thirds the length of the wing, and wedge-shaped.

The legs are feathered down on to the toes; the tarsus is about one-fourth the length of the tail; the toes are strong and of medium length.

This genus differs principally from *Aquila* in the longer wedge-shaped tail, but differs from all other Australian birds in its superior size.



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UROAËTUS AUDAX.

(WEDGE-TAILED EAGLE).

No. 298.

UROAËTUS AUDAX.

WEDGE-TAILED EAGLE (EAGLE-HAWK).

(PLATE 241.)

VULTUR AUDAX Latham, Index Ornith. Suppl., p. ii., 1801: New South Wales.

Bold Vulture, Latham, Gen. Synops. Birds, Suppl. II., p. 10, 1801.

Vultur audax Latham, Index Ornith. Suppl., p. ii., 1801.

Mountain Eagle of New South Wales, Collins, Acc. Eng. Col., New South Wales, pl. in p. 287, 1802; Barrington, Hist. New South Wales (1802), p. 441, 1803.

Aquila albirostris Vieillot, Nouv. Dict. d'Hist. Nat., Vol. I., p. 229, 1816: New South Wales; Pucheran, Rev. Mag. de Zool., 1850, p. 81.

Aquila fuscosa Dumont, Dict. Sci. Nat. (Levrault), Vol. I., Suppl., p. 90, 1817: New South Wales.

Falco fucosus Temminck and Laugier, Plan. Color. d'Ois., 6e livr., Vol. I., pl. 32, 1821: New South Wales.

Aquila fucosa Vigors, Zool. Journ., Vol. I., p. 337, 1824; Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 188, 1827; Gould, Synops. Birds Austr., pt. III., pl. 38, 1838; *id.*, Birds Austr., Vol. I., pl. I., 1848; Ramsay, Ibis 1865, p. 83.

Aquila audax Gray, Ann. Mag. Nat. Hist., Vol. XI., p. 189, 1843; *id.*, Genera Birds, Vol. I., p. 14, 1845-9; Gould, Handb. Birds Austr., Vol. I., p. 8, 1865; Gray, Handl. Gen. Sp. Birds, Vol. I., p. 11, 1869; Ramsay, Cat. Austr. Acc., p. 25, 1876; *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 177, 1878; Broadbent, Proc. Roy. Soc. Queensl., Vol. I., p. 93, 1884 (Q.); Ramsay, Tab. List Austr. Birds, p. 1, 1888; North, Aust. Mus. Cat., no. 12, p. 5, 1890; Ramsay, Suppl. Cat. Austr. Acc., p. 5, 1890; Keartland, Rep. Horn. Sci. Exped. Austr., pt. II., p. 106, 1896 (Central); *id.*, Trans. Roy. Soc. S.A., Vol. XXII., p. 166, 1898 (N.W.A.); North, Austr. Mus. Cat., no. 4, p. 23, 1898.

Uroaetus fucosa Kaup, Class. Saug. ü Vögel, p. 121, 1844.

Uraetus audax Kaup, Mus. Senckenb., Vol. III., p. 260, 1845.

Uraetus fucosa Kaup, *ib.*

Aquila cuneicaudata Brehm, Isis 1845, p. 356: New South Wales.

Uroaetus audax Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 231, 1874; Gurney, List Diurn. Birds Prey, p. 57, 1884; Legge, Papers and Proc. Roy. Soc. Tasm. 1886, p. 3, 1887 (Tasm.); *id.*, *ib.*, 1887, p. 84, 1888 (Tasm.); Hall, Key Birds Austr., p. 1, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 11, 1901; Milligan, Emu, Vol. II., p. 70, 1902 (W.A.); Le Souëf, *ib.*, p. 139, 1903 (N.T.); Hill, *ib.*, p. 161, 1903 (Vict.); Carter, *ib.*, Vol. III., p. 32, 1903 (W.A.); Berney, *ib.*, p. 123, 1903 (Q.); *id.*, *ib.*, p. 187, 1904 (Q.); *id.*, *ib.*, Vol. V., p. 16, 1905 (Q.); Mellor, *ib.*, Vol. VI., p. 163, 1907 (Tasm.); Hill, *ib.*, p. 177, 1907 (Vict.); Batey, *ib.*, Vol. VII., pp. 2, 43, 1907 (Vict.); Mathews, Handl. Birds Austral., p. 40, 1908; Mattingley, Vict. Nat., Vol. XXVI., p. 71, 1909 (Vict.); Whitlock, Emu, Vol. VIII., p. 176, 1909 (W.A.); Mathews, *ib.*, Vol. IX., p. 67, 1909 (N.T.); Crossmann, *ib.*, p. 86 (W.A.); Hall, *ib.*, p. 126, 1910 (S.A.); Ingle, *ib.*, Vol. X., p. 121, 1910 (Vic.); Littler, Handb. Birds Tasm., p. 5, 1910 (Tasm.); Ogilvie-Grant, Ibis 1910, p. 170 (W.A.); North, Austr. Mus. Spec. Cat., No. 1, Vol. VI., p. 200, 1911; Carter, Emu, Vol. X., p. 295, 1911 (W.A.); Wilson, *ib.*, Vol. XII., p. 31, 1912 (Vict.); Stone, *ib.*, Vol. XII., p. 112 (Vict.); White, *ib.*, Vol. XIII., p. 23, 1913 (S.A.); Macgillivray, *ib.*, Vol. XIII., p. 150, 1914 (Q.); Barnard, *ib.*, p. 205, 1914 (N.T.); Roche, *ib.*, p. 214, 1914 (Vict.).

Aquila audax audax Mathews, Nov. Zool., Vol. XVIII., p. 247, 1912.

Aquila audax carteri Mathews, *ib.*, Gracefield, West Australia.

Uroaetus audax audax Mathews, List Birds Austr., p. 105, 1913; *id.*, Austral Av. Rec., Vol. II., p. 90, 1914; White, Emu, Vol. XIV., p. 186, 1915 (Central).

Uroaetus audax carteri Mathews, List Birds Austr., p. 105, 1913.

DISTRIBUTION. Australia; Tasmania.

Adult male. General colour blackish above and below, a red nuchal collar with white bases, and black tips to the feathers; median-coverts and some of the upper tail-coverts brown. Quills black with white bases, more noticeable on the underside; under wing-coverts black, brown on the edge of the wing; under tail-coverts brown. Bill grey, tip black, cere and corner of mouth light yellow, the skin seen beneath the feathers round the eye very pale yellow; eyes golden brown; feet dirty white. Total length 880 mm.; culmen 45, wing 605, tail 395, tarsus 103. Figured. Collected at Gracefield, South-west Australia, 4th May, 1908.

Adult female. Similar to the adult male, but larger.

Another phase (*Eastern*). Upper-surface, including head, back and upper wing-coverts strongly rufous, deeper on the nape. The head with black shaft-streaks, which are missing on the nuchal collar. Interscapular region brown with red tips, which become obsolete towards the rump. Upper tail-coverts grey on the outer and buff on the inner webs. Tail, primaries and secondaries black, a few of the innermost secondaries and innermost primaries mottled with grey. Bar on the upper wing-coverts rufescent, the upper series more or less brownish; throat with blackish brown feathers and red tips which persist on the sides of the breast. Abdomen blackish-brown: under tail-coverts pale rufous; under-surface of the tail showing obscure bars towards the tips. Under-wing showing brown and rufous mixed. Collected at Alexander, Northern Territory, on the 26th of October, 1905.

Immature. Paler, as shown by Grant and quoted below.

Nestling. Covered with white down.

Nest. A very bulky structure made of sticks and lined with soft bark and leaves. Outside measurements 5 to 8 feet across and sometimes as deep. Inside 12 to 15 inches across by 3 to 4 deep.

WEDGE-TAILED EAGLE (EAGLE-HAWK).

Eggs. Clutch one or two, rarely three; ground-colour light buff, often white covered all over with lavender spots or blotches, the latter more noticeable at the larger end. A set from Alexander in the Northern Territory measures: axis 71 to 74 mm., diameter 56-61. From the Dawson River, 72-78 by 55-62; West Australia 66-68 by 56.

Breeding-season. July to September, usually.

WHILE it is certain this bird was met with by the early voyagers and recorded under the term "Eagles," no one seems to have been struck by it so as to give details. This may be due to the fact that the imperfect firearms possessed by the early investigators were unable to effect the death of this noble bird.

At any rate, the first definite record only appears in 1801, when Latham described it as *Vultur audax* from one of the Watling Drawings. After his description Latham wrote: "This is a native of *New Holland,* but although the size of it is uncertain, we may suppose it not to be one of the smallest, and certainly is a fierce species, as it is said to kill the *Pottegorang*, and even to attack the natives themselves, who know it by the name of *Boora-morang.*"

When Sharpe worked through the Watling Drawings, of which this is No. 1, he commented (*Hist. Coll. Nat. Hist. Brit. Mus.*, Vol. II., p. 109, 1906): "Latham copies Watling's original note about the native name being 'Boora-morang' (Watling writes it 'Boo-ro-ma-rang') and also about the bird sometimes attacking natives, but he says not one word about Watling or James Lee in the text of his book, nor can I so far find any evidence of his giving credit to either of them as the source of his information. The bird is drawn holding a fish under its foot, and might be mistaken for a young *Haliaëtus leucogaster*, but on comparing the sketch with specimens, it is evidently intended for a Wedge-tailed Eagle, as is also shown by its feathered legs. Latham says that 'the size of this bird is uncertain.' Watling generally gives the size of his birds, but on this picture he gives a scale, which shows that the specimen was about three feet long."

As a matter of fact, the description is imperfect, being based upon this figure, which is an inferior one. I hope to fully determine the entire history of the Watling Drawings one day, but might here state that it is pretty certain that the present drawing was not made by Thos. Watling himself, and this accounts for the poor painting seen in this instance.

The Eagle was beautifully figured under the name *Falco fucosus* in the *Planches Coloriées* by Temminck and Laugier, and this name gained currency, but when the Watling Drawings were examined by Gray, Strickland and Gould, the Lathamian name was recognised and adopted, first by Gray and then by Gould. It has since been shown that Vieillot, prior to Temminck, had named the bird *Aquila albirostris*, and only very recently I have noted that Dumont in 1817 had published Peron's name (*Austral Avian Rec.*, Vol. II., p. 90, Sept. 1914). Vieillot's description is good and should not have been overlooked, though this cannot be written of Latham's account.

In 1802, a beautiful figure was published in the second volume of Collins' *Account Eng. Col., New South Wales*, opp. p. 288, under the title: "Mountain Eagle of New South Wales will kill a large sized Kangaroo. Published May 1, 1802." In the text, p. 287, we read under date March, 1800: "Captain Waterhouse, in an excursion which he made to the north arm of Broken Bay, wounded and secured a bird of a species never seen before in New South Wales, at least by any of the colonists. It was a large eagle, which gave proof of his strength by driving his talons through a man's foot while lying at the bottom of the boat with his legs tied together. It stood about three feet in height, and during the ten days that it lived was remarkable for refusing to be fed by any but one particular person. Among the natives it was an object of wonder and fear, as they could never be prevailed upon to go near it. They asserted that it would carry off a middling-sized kangooroo. Captain Waterhouse hoped to have brought it to England, but it was one morning found to have divided the strands of a rope with which it was fastened and escaped. A drawing had been made of it while in our hands, of which the annexed engraving is a copy."

The same year, but certainly later, as the plates are dated Nov. and Dec., a "History of New South Wales," by G. Barrington, was published. (1802 is the date on the title-page, but I now see one plate is dated Jan. 21, 1803). A good account of the Natural History is given, which is certainly compiled from the same sources as all the previous accounts —as Phillips, White and Collins—and not much new is given in the text but which is characterised by novel illustrations. Opposite p. 441 a plate of the Mountain Eagle appears, wherein the bird is seen standing (with outstretched wings) upon a Dingo, tearing the flesh, the tail being shown nearly even. The account given on p. 441 may be here reproduced, as it does not seem to have been previously noticed.

"The Mountain Eagle of New South Wales is a fine majestic bird, which stands three feet high on the ground. The colour of its feathers are brown: the feet pale yellow, and the talons, which it uses with the greatest force *, are black: the beak is of a yellowish horn colour, and the crest, which is constituted by a few feathers, has a yellow sandy appearance.

This bird is both an object of wonder and fear among the natives, for it frequently takes up a kangaroo, a dog, or a sheep, and probably they have little doubt but that, if driven by hunger and nothing else offered, the Mountain Eagle would descend for the purpose of carrying off a native. *One taken by Captain Waterhouse while on an excursion by water, drove its talons through a seaman's foot, though it lay at the bottom of the boat with its feet tied."

It is obvious this account was prepared from the same specimen as Collins', but I cannot reconcile that writer's statement with Watling's Drawing. Collins wrote of it under March 1800 as a species "never before seen," but Watling's Drawing was made long before that date.

Captain S. A. White has written me: "Very widely distributed over South Australia and in some districts very numerous; the squatter has a great grudge against this fine bird, but I am quite sure they do the landowner a great deal more good than harm, for they destroy thousands of rabbits to an occasional weakly lamb. They are very cunning birds and seem to know directly a person is armed. They nest during August, September and October, and often rear two broods in the season. The second clutch of eggs is always very pale in colour and mostly consists of a single egg. The nest is a large bulky structure of large sticks, sometimes placed in almost inaccessible places, but other times in quite a small tree not far from the ground. One pair of birds if not disturbed will renovate the same nest for many years. Just before the female lays the first egg she places a few green gum boughs in the nest with the leaves towards the centre. I have never known any clutches of three, invariably two or one."

Dr. A. Morgan expresses the same sentiments as he states: "Common throughout South Australia, an occasional pair being seen within seven miles of Adelaide in the Mount Morgan range, though they no longer breed there. They feed upon carrion (they are not all particular about their food being fresh), rabbits and small marsupials. They have a bad reputation as lamb-killers, but I am very doubtful if it is deserved; that they eat dead lambs is undoubted, but I only know of one instance in which an eagle has been actually seen to attack a live lamb. They occasionally carry off poultry if they find them far enough away from the homestead. The nest is a huge mass of sticks up to 1½ inches in diameter: it is generally placed high up in the largest tree available, but in districts where there are no large trees they choose any one which is strong enough to bear the weight of the nest. In the Gawler Ranges in August, 1902, Dr. Cheney and myself found a nest the bottom of which could be reached, and in July, 1900, I found a nest at

Mt. Gunson, built in a myall (acacia sp.) about 20 feet from the ground. I found many nests at the R. Finnis, near Lake Alexandrina, and in the Flinders Ranges near Laura and at Port Augusta, in every case placed in great gum-trees at least 40 feet from the ground and often quite inaccessible. They lay two eggs, in rare instances only one. I do not know of an instance of three having been found. One egg is almost invariably much more lightly blotched than the other, and I have seen one clutch which was quite white: average size of eleven eggs, 7.25 cm. × 5.82 cm.; largest egg 7.65 × 6.10 cm.; smallest 6.70 × 5.65 cm. This last egg was the only one in the nest and was almost white. The eggs are laid during the months of July and August."

Mr. Thos. P. Austin, from Cobbora, New South Wales, has given me the following note: "To view this bird as it is usually seen, it would not strike one that it was a fast-flying species: its lazy flapping flight, or its soaring with motionless wings high up in the air, gives it the appearance of moving very slowly, but if anyone watching an Eagle under these circumstances takes note of the distance they travel in a few minutes, it will then be realised that they are travelling through the air very much quicker than they appear to be. To see one chasing its prey, such as a rabbit or a hare, with half-closed wings and short jerky movements, it looks a vastly different bird to under ordinary circumstances, as at these times the rapidity of flight is simply astounding. Should it miss its prey, it shoots forwards and upwards into the air, with almost closed motionless wings, to a height of about a hundred feet, then with a very sudden movement it turns towards earth, and darts down again like an arrow until within a few feet of the ground some little distance behind its prey: then again it will make another terrific rush forward, and should it miss again, the same thing will go on and on until it succeeds, or the animal it is chasing escapes under cover. These Eagles usually work in this manner in pairs, one bird always following behind the other. In some districts they are extremely numerous, and in these localities do a vast amount of damage to stock, especially in a drought when sheep are very weak. In the Mallee Country, in the north-west of Victoria, I have counted as many as fourteen of these birds feeding upon, or sitting around, one dead sheep. Here, although moderately plentiful, they do no damage to anything that I know of. Owing to the wholesale manner that this fine bird is shot and poisoned, it is a marvellous thing that it is not nearer to being completely exterminated; there are very few people who fail to shoot them whenever the opportunity arises. Many thousand of them must be destroyed annually, and yet they appear to be holding their own fairly well. I have examined a great many of their nests, and have seen them placed in a great variety of situations. In the Mallee Country of Victoria, where there were no very large trees, these birds used to resort to the open blue-bush plains to breed, and there would place their large nests on top of a bush, which invariably grew somewhat the shape of an umbrella, and seldom more than eight feet in height, so the nests could usually be reached into by a man on horseback. In other districts where large timber is plentiful, they usually choose a large tree, and mostly one which is situated in such a position that the birds can get a good view of the country for many miles, in at least one direction. If they are not disturbed they will probably return to the same nest for many years; under these circumstances the nest in a few years becomes an enormous structure. They appear to have a habit of building a great many nests for some other purpose than breeding, as in this district I find they only lay in twenty per cent. of the nests built. While in the Bourke district for a fortnight, towards the end of 1910, I saw more nests of this species during that period than I have seen in any other ten years of my life: they were extremely numerous and mostly placed in small trees. These birds were not breeding while I was at Bourke; only one nest had one fully-fledged young, as they mostly lay during May, June and July."

Gould's own observations read: "I find by my notes that one of those killed weighed nine pounds, and measured six feet eight inches from tip to tip of opposite pinions: but far larger individuals than this have, I should say, come under my notice. The natural disposition of the Wedge-tailed Eagle leads it to frequent the interior portion of the country rather than the shores or the neighbourhood of the sea. It preys indiscriminately on all the smaller species of Kangaroo which tenant the plains and the open crowns of the hills, and whose retreats, from the wonderful acuteness of its vision, it descries while soaring and performing those graceful evolutions and circles in the air so frequently seen by the residents of the countries it inhabits; neither is the noble Bustard, whose weight is twice that of its enemy, and who finds a more secure asylum on the extensive plains of the interior, safe from its attacks: its tremendous stoop and powerful grasp, in fact, carry inevitable destruction to its victim, be it ever so large and formidable. The breeders of sheep find in this bird an enemy which commits extensive ravages among their lambs, and consequently in its turn it is persecuted unrelentingly by the shepherds of the stock-owners, who employ every artifice in their power to effect its extirpation; and in Tasmania considerable rewards are offered for the accomplishment of the same end. The tracts of untrodden ground and the vastness of the impenetrable forests will, however, for a long series of years to come afford it an asylum, secure from the inroads of the destroying hand of man; still, with everyone waging war upon it, its numbers must necessarily be considerably diminished. For the sake of the refuse thrown away by the

Kangaroo-hunters it will often follow them for many miles, and even for days together. I clearly ascertained that, although it mostly feeds upon living prey, it does not refuse to devour carrion or animals almost in a state of putridity. During one of my journeys into the interior, to the northward of the Liverpool Plains, I saw no less than thirty or forty assembled together around the carcass of a dead bullock, some gorged to the full, perched upon the neighbouring trees, the rest still in the enjoyment of the feast."

Campbell, in his *Nests and Eggs Austr. Birds*, Vol. I., p. 14, 1901, noted: "Whether it be a fact or not, a newspaper is responsible for the following remarkable note: 'It is not generally known that the Eagle-Hawk constructs a table on which to eat its food. I had often mistaken these tables for old nests, till one day I found one in a gidgea-tree on the Warri Warri. The bird was perched on top, feeding. Under the tree was a mass of bones and feathers. I climbed up, and was surprised to find that the supposed nest was a structure of stout thick sticks, closely and skilfully interlaced, with a top almost square and as flat as a board. On it was a small and half-devoured wallaby. I have climbed up to and examined many such structures since, and, as I have seen several nests of the Eagle-Hawk, some of which contained young birds, I may safely assume that these tables are specially constructed for eating on. The Eagle-Hawk generally builds its nest in the top of the highest tree. I have always found the "tables" in very low trees—such as the gidgea.—E.S.S.' "

I have reproduced this account as Berney refers to it in the extract given hereafter.

In the *Aust. Mus. Spec. Cat.*, no. 1, Vol. III., pp. 200-211, 1911, North has given an exceptionally full and fine account of this fine bird and I here give some of the most interesting items of his account. He records, with sadness, that this Eagle is a "Noxious Animal" in New South Wales, and that from the Official Report of the Department of Agriculture it appeared that in 1899 bonuses were paid for the slaughter of the enormous number of **7865** "Eagle-Hawks." How rapidly this slaughter told upon the species may be gathered from the supplementary statement that in 1907 only **835** bonuses were paid.

North states: "There is a great variation in colour of adult birds, some of them being much paler in breeding-plumage on the nape, hind-neck and upper wing-coverts being of a light creamy-buff. Usually this is put down to youth, but such is not always the case, as may be seen by the quills and tail-feathers, many being found breeding before they assume the general blackish-brown plumage, and which is only the livery of very old birds."

WEDGE-TAILED EAGLE (EAGLE-HAWK).

Mr. H. L. White's notes, from Belltrees, Scone, N.S.W., read: "The Eagle-Hawk (*Uroætus audax*) is fairly numerous, but not in such numbers as formerly. Some thirty-five years ago, when the system of shepherding was abandoned in favour of paddocking sheep, Eagles were a great curse at lambing-time. The ewes were allowed to run, practically unattended, in very large paddocks, and the Eagles levied a heavy toll upon the lambs. I know of an instance where a boundary rider shot or poisoned one hundred and twenty Eagles in eight weeks; probably as many more died unnoticed. After some twenty years of war against them, their numbers were so reduced that the damage done became practically *nil.* At the present time their destruction is not encouraged, as the value of the few lambs they kill is more than balanced by the numbers of young marsupials, hares, etc., they destroy. I have found the Eagle to be a stupid, quiet bird, very inquisitive and usually easily approached. Upon one occasion, when rolling a large stone down the side of a steep mountain, I heard a rushing sound pass overhead and noticed a dark object, with almost incredible speed, follow the stone until a patch of thick timber was reached, when a sudden opening of the wing revealed an Eagle. The bird had evidently been attracted by the moving stone, and shot after it with closed wings. Upon another occasion an Eagle seized and attempted to carry off a full-grown fox-terrier that was following me. Nests are frequently met with, usually in the highest trees, growing on sides of mountain spurs. I know of one nest which has been in use for twenty-five years, but whether occupied regularly every year I am unable to say; off and on during the time mentioned I have noticed young birds in it. In 1908 I wanted the eggs, but found a pair of newly-hatched young instead. Eagles' eggs present a great variety of colouring, those in my collection ranging from heavily-blotched to dirty white specimens. A similar experience, with regard to the dog attack and stone-chasing episode, befell the Rev. J. Milne Curran at Mt. Kosciusko, as related in the same place by North. A further excerpt from the pen of Mr. Robert Grant, taxidermist of the Australian Museum, is here given: 'In November, 1883, while on a collecting trip at Colliburi Station, Narromine, N.S.W., Mr. Stevenson, one of the proprietors, pointed out a Wedge-tailed Eagle's nest in a large Gum-tree close to the river, and told me that it contained young, as he had noticed the birds carrying food to the nest. As I was anxious to secure both parent birds and young, I was up at sunrise next morning, and placed myself in concealment within gun-shot of the tree. Although I waited there three hours neither of the parent birds came near, and I left for camp, one of my companions relieving me. We watched in turn all that day and the next, with the same result, and then decided to cut down the tree, as it was hopeless to attempt to climb to the nest.

After some hard work we felled the tree, and when the dust was cleared away we found a young bird apparently about a week old, and fortunately alive. The heap of sticks and rubbish of which the nest was formed would have filled a large dray; in it were the remains of small wallabies, "Wood Duck," Straw-necked and White Ibises, and a White-fronted Heron. We remained in the vicinity another two days, but I only saw one of the parent birds once, and that was at a great height in the air. I took the Eaglet home with me to Lithgow, and we had no difficulty in rearing it, as it could eat butcher's meat and small birds readily. When it reached maturity we built a large aviary of battens. For the first five years its head and neck-feathers were of a pale fawn colour: for a similar period they were rich rufous brown on these parts. After the next moult, and when ten years old, the entire plumage changed to a glossy black, and remained so ever afterwards. During its captivity it was answerable for the lives of a few domestic cats that used to go into its aviary after the meat or birds, but although it killed them it did not eat them. When eighteen years of age this Eagle met with its death in a tragic manner; the yard of our house adjoined the Lithgow Ironworks, and the burning slag set fire to its aviary, and although my brother quickly rescued it at the time, it only lived a few hours, the shock killing it. On skinning and dissecting the bird it was found to be a male.' This note gives the plumage-changes as they may take place, but whether the time can be utilised or not is quite uncertain: at any rate it would confirm the suggestion that the black only comes with age on the east. From the west, young birds are more or less black, and almost certainly the whole black plumage is very rapidly acquired."

There are many other notes worth consideration in the same place, but all these cannot be reproduced here, and there are especially good accounts of its nesting habits and the eggs.

Berney, of Queensland, in the *Emu*, Vol. III., p. 123, 1903, wrote: "On the 5th June I found an Eagle's (*Uroaëtus audax*) nest containing two eggs, which the old bird was loath to leave. By the platform of the nest was the freshly-killed, headless body of a White-fronted Heron (*Notophoyx novæ-hollandiæ*), from which the legs and wings had also been removed. It is probable that the male bird feeds its sitting mate during incubation. This is more likely, as, being winter-time, the eggs would not bear exposure for any lengthened time. This nest, I may state, is five days earlier than the earliest record in 'Nests and Eggs' (Campbell). The stomach of the Heron was crammed with grasshoppers. In the side of the Eagle's nest two Chestnut-eared Finches (*Taeniopygia castanotis*) had built their own (a favourite resort of these Finches) and were busy feeding their family of four or five naked squabs. Doubtless the little birds felt secure beneath the notice of the 'kingly bird,' whose proximity at the same time kept off prowling Butcher-Birds and Crows. In the country of open downs the Wedge-tailed Eagles are forced at times to choose strange sites for their nests; frequently these are placed in such low bushes that I can ride up alongside and see if the nest contains eggs or young, and I hear of one containing young where the top of the nest was little higher than a table. By-the-by, I am sceptical about the Eagle's building 'dining-tables' (*vide Nests and Eggs*, p. 14). The 'menu' of *U. audax* is varied, and includes lambs (a standing dish), iguanas, kangaroo-rat (an unfailing bait for poisoning purposes), Bustards or Wild Turkeys, sucking-pig (plenty of wild pigs on the river), domestic fowls, and recently they took from quite close to the homestead two goat kids that were a few days old. As regards length of wing of these birds, I measured five last week—two 6 feet, two 6 feet 6 inches, and one seven feet from tip to tip. The two smallest looked very small and the seven-foot bird looked nothing more than a fairly big one to me. A neighbour of mine who takes a passing interest in ornithology tells me that one he poisoned looked so unusually large that he measured it and found the expanse of wings to be 9 feet. This, though exceptionally large, is, I think, quite possible. It does seem a pity to poison such noble birds, but I fear on this open country you cannot rear lambs and Eagles together."

In a succeeding number Berney added (p. 187): "Hearing that these birds were unusually numerous in the Hughenden district (N.Q.), I wrote for information to Mr. J. H. Frith, of Hughenden station, who kindly gave me the following details. In eight months of this year (1903) they had poisoned one thousand and sixty (1,060) Eagles; at one lamb he had known as many as 12 or 14 to be poisoned. Poisoning an already poisoned dingo, one morning he gathered eighteen dead Eagles from about it in the afternoon. I do not think it is any exaggeration to say that Hughenden station alone must have lost some thousands of lambs by Eagles this year."

In view of these figures, I hope that the extinction (if it should occur) of this fine bird will never be laid to the charge of bird-collectors, as is so commonly the loss of British-breeding birds of prey. It must be obvious to the most prejudiced mind that there is not a bird-collection possible at present of incorporating 1,060 specimens of such a large bird as this, and it is probable that all the skins preserved in the world of this species would not total one-third of one thousand and sixty, which, be it remembered, *is the toll for eight months only on one Australian station.* If Bird Protectors would only study such a fact as this, they would not make the continual ridiculous remarks they do about extermination by bird collectors.

Later again (*Emu*, Vol. V., p. 16, 1905), Berney furnished the following account: "Plentiful enough here, whether on the open downs or the timbered basalt country, but their numbers vary one time with another, without showing any regularity in their coming and going. As an instance of what a sheepman would call a bad time, I may mention the experience of Hughenden station, previously recorded, where 1,060 were poisoned in eight months. On the other hand, there are times when it would be hard to find a representative of this grand bird. On the open country, where timber worthy of being called trees is absent, they often place their nests in low bushes. I have many times been able to ride up alongside the nest and ascertain the contents without dismounting. Eagles commence laying at the end of May, and the dates of my two latest clutches of eggs are 3rd and 14th August. The eggs vary greatly, the two forming a clutch often being of different types as regards colour and markings. I found a fine pair of eggs, quite white, in July, 1904, and took them out of the nest without getting off my horse; they were an exceedingly large pair, measuring: (1) 3.19 × 2.59, (2) 3.06 × 2.5 inches. It seems curious that, so far as my experience goes, only one of the pair of young birds in a rest reaches maturity. I have seen many pairs in the down, but I have no record of ever having seen more than one feathered youngster at the nest. On mentioning the matter to two of my neighbours, they stated their experience was similar. As regards Eagles taking their time at nest-building, I can confirm Mr. Chas. Barnard's experience (Campbell, *Nests and Eggs*, p. 14). After apparently finishing a nest, they sometimes leave it for two or three weeks, and then, returning, add more green leaves to the lining and lay straight away. I have been keeping the measurement of the spread of the wings of these birds, and the average of ten individuals is 6 ft. 5 in., ranging from 6 feet to 7 feet; this was rather disappointing to me, as I had expected bigger results, and I still think I have seen birds that would go some inches over 7 feet."

In the succeeding volume Berney contributed a further note (*Emu*, Vol. VI., p. 13, 1906), as: "There have been very few Eagles (Wedge-tailed) about here, but the overseer of a station farther down the river (Flinders) told me they had been bad where he was, which he attributed to a visitation of rats (a mild plague). We had no rats at Spring Valley—never saw one. The Eagles were very partial to them—every nest that he examined which was occupied by a sitting bird or young was well supplied with rodents. He told me that he found between sixty and seventy nests during the past winter with either eggs or young, and on my asking him how often he thought both youngsters in a nest reached maturity, or at least an age able to fly, he said that seldom both survived, but this year, owing, he thought, to the superabundance of food (rats), there were decidedly more than usual. Not only that, but he found this year what he never saw before, and that was two nests with *three* eggs in, and one nest with three big, strong youngsters."

Mellor (*ib.*, p. 163), writing of Tasmania, states: "The Wedge-tailed Eagle (*Uroaëtus audax*) has also a bad name in the district, and is said to have carried off a small pig to its aerie," while Hill (*ib.*, p. 177), of Victoria, surpasses this: "On one occasion a large male bird was seen to hunt a calf three or four months old, while its mate flew from tree to tree, watching the proceedings. But for the timely arrival of the owner, there is little doubt that the calf would have been killed."

A much more pleasing phase of this bird's life is put on record in the same place (p. 209), thus: "At the November meeting of the South Australian Ornithological Association the value of the common Wedge-tailed Eagle (*Uroaëtus audax*), as a rabbit-destroyer, was discussed. The members fully confirmed a report by the Inspector of Fisheries that great numbers of rabbits were killed by a single pair of these birds for food while rearing their brood of young. It was contended that, although these birds occasionally secured a young lamb, the amount of good they did fully compensated for this, and in the majority of cases it was thought that they killed only weakly lambs, or those that had lost their mothers and would eventually die. In many cases they picked up the dead carcasses of freshly-dropped lambs. It was represented that infinitely more sheep and lambs died from the effects of shortage of food supplies, under the influence of rabbits, than were killed by the Eagles, whose energies in destroying the rodents increased the possibilities of grass fodder, and therefore it behoved the farmers to protect the Eagles as useful birds."

The succeeding number of the *Emu* (Vol. VII., p. 2, 1907) contained Batey's account of these birds as follows: "This great bird was very numerous in 1846. Shot-guns could have reduced it in a very slight degree: good rifles would, but we did not use that kind of firearm those days. Though Eagles were ever so plentiful, my tally was only four. I do not suppose my late father accounted for more than six in his day. When strychnine was introduced, however, it rapidly balanced accounts with these destructive birds. During the lambing of 1850, on the Emu Creek, my father poisoned dead lambs, and by the time dropping was finished I had 14 of the great birds laid in a row. It was ascertained that an Eagle's method of killing a young lamb was to drive its powerful talons through the skull of the defenceless creature. The bird then stood on the victim, broke into the fore part, and, working to the rear, if undisturbed, stripped the flesh, leaving only skin and skeleton. My experience of Wedge-tails covers a lifetime, yet I never saw one attempt to fly off with a young lamb, though at that stage it is a light weight. Lambing takes place before Eagles begin nesting, consequently when a lamb was killed there was no necessity to carry it away. In later times it was discovered Eagles had nested in tall trees in gullies in Brodie's Forest (near Melbourne, Victoria). Evidently these bulky structures last for a great number of years. In proof how destructive Eagles were, in 1850 I had charge of a strong mob containing lambs from three days to six weeks old. One morning, reaching my flock after sunrise, a brace of lambs lay dead, with the birds standing on them ; several other Wedge-tails were on the scene. If they had been left to follow their inclinations, the probabilities are that each bird would have slain a lamb."

A few pages further on Batey elaborated on this subject (p. 43) : "Now, with reference to the slaughter of lambs by Eagles, though my experience embraces six decades, I never saw a lamb actually killed by one of these birds. On this point all that can be said with any degree of certainty is that the Eagle in all cases had driven his strong talons into the brain of the victim. The skull of a lamb at birth, and for some time afterwards, is exceedingly fragile ; the muscular development of the bird's legs is very great, while its talons are keen, sharp and long, and, as a natural sequence, when pressure was applied the Eagle's claws went into the lamb's brain, leaving marks like pellets of shot. In my experience I never saw a lamb's skull crushed up. Judging from a Wedge-tail which we kept in captivity for some years, the bill, powerful as it seems, is not an offensive weapon. This bird was taken as a fledgeling from a nest built in a tall tree beyond Mt. Aitken homestead. We used to keep it secured with a dog-chain affixed to the top of a stump. Frequently the bird got loose, but, as one wing was always clipped, recapture was easy enough with the aid of a cornsack. Throwing this over the escapee, he was muffled up tightly, then a firm grip was taken of both legs above his ankles. It would close its beak on my hand. A Musky Lorikeet can nip sharply enough to draw blood, but this Eagle, with its formidable bill, did not make a scratch. Putting all things together, my opinion is that our magnificent Wedge-tailed Eagle only uses the bill in tearing off the flesh of the slain animal, for which the crook in the upper mandible is well adapted. Some few years ago, three of these fine birds were seen in company pursuing rabbits amongst thistles, when, finally getting one into the open, puss was captured in fine style. The bird tried to fly off with the prize, but the animal, a fully-grown one, was far too heavy. On examining this rabbit it was found that it had been killed with a vice-like grip of the bird's talons across the back sufficiently forward to compress heart and lungs. When an Eagle feasts on a young lamb it stands upon the carcass ; our pet did the same when rabbits were flung to it. This bird, when in that position, worked the sharp hook of its bill into the carcass, then with an up-drag tore off the flesh. In devouring a lamb, the Eagle broke into its side just behind the shoulder, and directly over the heart, lungs, and liver. Having swallowed these, the rest of the body was picked over. There is very little flesh on a lamb a few days old—in fact, less than is found on a full-grown rabbit—and our tame bird could easily dispose of the latter in a short time. Concerning the weight-carrying powers of a Wedge-tailed Eagle, it was stated one attempted to soar off with a rabbit and failed in that effort. Amongst birds of prey it is generally held that the female is larger than the male, consequently may carry a heavier weight. In my sheep experience, never on any occasion have I seen an Eagle try to fly with even a green lamb, and at that stage it is very light. It is true there was no absolute necessity to make that effort, because lambing falls long before these destructive birds commence to nest. It was common enough to see the great creatures circling about—apparently for the fun of the thing—with the cleaned-up skeleton of a lamb in their claws. The aforesaid remains comprised skull, vertebræ, legs, and skin. Wedge-tailed Eagles are not fastidious in their appetites, for they will eat the flesh of animals that die from natural causes, even when their carcasses have become putrid. This, in my opinion, is the reason why strychnine is so fatal to them. My father's mode of squaring accounts with the pest was taking a dead lamb, and removing heart, lungs, and liver, cut them into tempting morsels, strewed them around, touched each with a dose of the deadly poison. This done, he put strychnine on the remains. One day, with my brother, I went off two hundred yards to await events. Before the lapse of ten minutes an Eagle settled down. Its first proceeding was to bolt the scraps, then, stepping on to the carcass, it began to operate upon it. In a short space of time it became 'wobbly,' moved a few feet away, and fell prone upon its breast. The pair of us, running forward, found it beating the ground with partially extended wings, in the last throes of death. During this same year I witnessed another Eagle's death from strychnine. Three or four were circling leisurely above a grassy slope, but how high in the air cannot be said, save that they were beyond the range of a shot-gun. All at once one of them, shutting its wings tight, fell head foremost like a stone to the earth, and, hurrying across, I found the Eagle quite dead. Whether its life went out with the first contraction of the wings, or whether impact with the ground finished it, are points that cannot be decided. Some thirty years ago I had the opportunity of a lifetime in noting an Eagle making a swoop to capture a hare that was hiding in a bunch of tussock grass on our sheep-run. Beyond question it was a magnificent sight—in fact, no word-painting could give it accurately, for it was one of those things whose sublimity can only be realised by the eye. The bird when first observed might be one thousand paces distant, its altitude in the air two or three hundred yards. He swept forward with great speed—in short, I have never seen a Wedge-tail travelling so swiftly before. There was no flapping of wings. The whole performance was on a very gradually lowering line, whose terminus was a few feet directly above the game. On gaining that point he turned round, but before he accomplished that purpose, puss, springing from her cover, darted for a fence that had a 2-foot wall under its wires. The Eagle at once went in pursuit. The hare evaded him by running close to the wall—a favourite dodge with hares when chased by Wedge-tails. *Eagles are now rare birds in the region where I was brought up. This clearance resulted from the free use of strychnine.* Before the advent of that deadly poison our only means of coping with them were shot-guns, but if we had depended on them as engines of destruction Eagles would be plentiful now. In my boyhood's days they could be writ down exceedingly numerous. Some of the squatters had used iron dog-traps; one bird was shot minus a foot, which it was supposed to have left in the jaws of a trap. They are hard to kill with loose shot; if sitting with back towards the shooter their wings protect them, while if fired on directly in front, it takes strong going lead to reach vital parts. An overhead flying shot, I have found, is not effective."

I have italicised the statement, made from sixty years' experience by one who utilised the poison, that *strychnine alone* is the reason of the rapid extinction of this bird.

A note by Le Souëf in the same place (p. 37) is worthy of reproduction: "A pair of Wedge-tailed Eagles is generally to be seen on the summit of Buffalo Mountains. The surveyor, Mr. O. A. L. Whitelaw, informs me that whenever he places a red flag as a trig-mark on a pole at the top of the Horn or the Hump, these Eagles tear the flags to pieces, often within two hours of their being erected. Whether the birds object to the flag because it is red I cannot say, but Mr. Whitelaw was going to place a white flag on the pole, hoping it will not share the same fate as the red ones. I saw the claw-marks of the birds on the pole when examining the torn remnants."

In the *Emu*, Vol. X., p. 121, 1910, Ingle, writing of the Birds of South Gippsland, remarks: "This noble bird was numerous until three years ago, since when they have almost entirely disappeared. This disappearance is almost entirely due to the poisoning of carcasses of sheep, and to vandal sportsmen (?). Personally, I think that within a very short space of time the species will become extinct."

Here we at once see the blame partially attributed to "vandal sportsmen" (?) and I foresee in a few years a still greater blame attributed to such, whereas it is obvious from Batey's admission that in this case *they are peculiarly free from blame.* I make this comment so that in fifty years' time, *when this bird will be entirely extinct in Victoria without much doubt,* the facts may be at hand for reference. I am no supporter of the "pot-hunter," vandal or otherwise, but it is unfair to load more crimes upon him when justly he has his own share.

A better report from the Victorian Mallee, by Erasmus Wilson (*Emu,* Vol. XII., p. 31, 1912), reads: "These noble birds were frequently seen during the trip, and several nests observed, two of which were occupied. One was placed about 25 feet up in a leaning mallee-tree, and contained one egg, but on revisiting it a week later the egg had disappeared. The vast quantity of rabbit remains strewn about the nests testified to the immense amount of good these birds undoubtedly do, and which I think nullifies the harm they are accused of doing in taking a stray lamb occasionally."

An interesting note by Stone, in the same place (p. 112), adds: "Some years ago, about 4 miles from Lake Boga (Victoria), I took from an Eagle's eyrie two Eaglets like two big balls of white fluff. I carried them home in a covered conveyance, the parent birds keeping me in sight the greater part of the way. Soon after dawn next morning the young ones commenced loud cries, and on investigating the reason I discovered the two old birds coming in the distance. Upon arrival they circled in the air at an altitude of, perhaps, half a mile, and this was repeated daily many times for nearly three weeks. In the course of time one Eaglet died, but the other grew into a fine bird. I kept it chained by the leg to a fence, but occasionally allowed it its freedom for an hour or two. On one occasion it knocked down and pecked an infant. I thereupon packed the bird into a crate and despatched it to Melbourne. About six months afterwards I was very much surprised to find that the Eagle had flown back to me. There was no doubt about it being the same bird—it allowed me to catch it, and the ring of wire was still around its leg."

Macgillivray (*Emu,* Vol. XIII., 1914, p. 150), states: "Common in the Gulf Country (Queensland). At Lorraine, on the Leichhardt River, Mr. McLennan 'saw a Nankeen Heron that he had previously disturbed coming down the river at full speed with a Wedge-tailed Eagle in pursuit. The Eagle stooped when opposite him, but missed the Heron, which took refuge in the tea-tree.' At Cape York this Eagle was noted on two occasions."

The following "Stray Feather" from the *Emu,* Vol. XIII., p. 214, April 1914, needs comment: "Eagles.—About two months ago I saw two large Eagles (*Uroaëtus audax*) near the Werribee Gorge, Victoria, and estimated the wing spread of each at 10 feet. In the following week one of the birds was shot by the boundary rider and was measured by Mr. Robert Honnan, pastoralist and owner of the station (late Staughton's). The wings measured 11 feet from tip to tip. Part of the plumage was nearly jet black. The remaining Eagle still haunts the locality.—W. Gubbins Roche."

This is the record measurement I have seen, and it seemed almost incredible, but I find it confirmed in the following extract from the *Victorian Naturalist*, Vol. XXVI., p. 71, 1909, where Mattingley, writing of the Mallee Country, Victoria, observed: "The following day we started to follow the Patchewollack Pad, and while driving through the home paddock we noticed a pair of Wedge-tailed Eagles apparently tearing a lamb to pieces and feasting upon it. An expectant circle of Ravens surrounded the Eagles, but keeping at a respectful distance of about 15 yards, as they waited in readiness to secure any scraps which the eagles might overlook. Driving rapidly up in the buggy, the birds rose and flew a short distance away to await our retirement. Examination showed they had killed a large white domestic rooster, which had boldly engaged them in combat so as to protect the hens. One of the station hands informed us that he had laid poison for the eagles and had destroyed over 200 in the course of a year. Remonstrance seemed useless in a case like this, but the large amount of good done by eagles in destroying vermin, which more than counterbalances the harm done, was not sufficiently convincing to the people living in this district. The largest bird destroyed measured over 9 feet from tip to tip of extended wings. It may be mentioned that our Wedge-tailed Eagle, *Uroaëtus audax*, often called Eagle-Hawk, is the largest true eagle in the world, and specimens have been taken measuring more than 10 feet across the wings."

Though thousands of these birds have been poisoned, there are not large series available for study, as its large size first militates against the preparation of many skins, and secondly against the accumulation of numerous specimens. Thus fifty skins would take up a lot of room, yet be quite insufficient to determine the subspecies living on the Australian Continent. Thus it may be suggested that the Cape York birds may be much smaller than New South Wales birds, while Tasmanian birds may be larger than the latter. Western birds may be smaller towards the Northern Territory than the southern birds.

In the *Nov. Zool.*, Vol. XVIII., p. 247, 1912, I separated the Western form under the name *Aquila audax carteri*, giving as differential features: "Differs from *A. a. audax* in its darker coloration, noticeable in the adult in the under-surface and the under tail-coverts, and the brighter coloration of the nape feathers; in the young the darker coloration is still more apparent in all stages. Gracefield, West Australia."

Black specimens are recorded from the East, but when noted it is always connected with old age and commented upon. Western birds show blackness in their immaturity, and are thus easily separable. I had conservatively been inclined to temporarily sink this Western form, but I note that Milligan, in a note hereafter quoted, observed this iron-black plumage, and concluded it was due to age, but Keartland, whose record I also add, definitely indicates the absence of the light colour in the west. I therefore conclude two valid subspecies are at present recognisable, as admitted in my "List," p. 105, but I suggest reconsideration of the ranges there given and probable admission of more subspecific forms. The succeeding notes refer to the Western race.

Mr. Tom Carter has written me: "The Wedge-tailed Eagle (aboriginal name, WĂRREE-DÀ) occurs throughout the State. At Point Cloates they were not very common, probably because there was no timber near, but a few pairs bred in the rugged range that commences at Point Cloates and ends at Vlaming Head (near the North-west Cape), a length of nearly 80 miles. They were very plentiful in the lower Gascoyne River, in 1887, when I was on a lambing camp. One morning I poisoned fifteen from the carcass of a sheep. This was on Boolathanna Station, and Mr. Chas. Brockman, the pioneer of that country, told me that in the year 1880 'Eagle-Hawks' were there in immense numbers, and that he counted more than 500 in one flock. He himself shot 40 in one day, as they made great havoc among his ewes and lambs. When a Wedge-tailed Eagle has finished eating a lamb, it leaves the skin neatly turned inside out. They are early breeders in the North-west, laying very regularly about the end of May. The nest is placed high up in a tree, if one is conveniently situated; but on the vast salt-marsh country on the coast, north of the Gascoyne River, I have seen nests built a few feet from the ground on the top of a spreading bush. One egg is the usual clutch, but occasionally two. June 2, 1887. Nest with two eggs on Gascoyne River. On May 22, 1900, I found a nest with one egg in a gorge in the Point Cloates range. The nest was on a wide ledge on the face of a cliff, and walking to the edge of the cliff, I fired both barrels at the old bird as it left the nest a few feet below me, but with no apparent effect. On the edge of the nest was laid a dead cat, freshly killed (*i.e.* domestic cat in wild state). On May 28 I visited the nest again, and again fired at the bird as it came off and took a second egg. On June 4 I took a *third* egg from the same nest, so these birds are not easily scared away. On June 30, in the same year, I took an egg from another nest built in a similar position, in the same range, about a mile from the first nest. I fancy it was built by the same pair of birds, which were no worse for my shooting. On July 25, 1899, I found a young bird in down in a nest built in a stunted tree in a gorge in the Point Cloates Range.

"At Broome Hill and throughout the South-west these eagles are still numerous, but must diminish with increasing settlement. When at Lake Muir last year (1911), Mr. A. F. R. Muir told me that he usually poisons or shoots about 50 every year, and that his uncle, on the opposite side of the Lake, kills about the same number, and has been doing so for years. At Broome Hill the eagles make an appearance as soon as the lambing season starts, and from May until July they take a heavy toll of lambs and ewes that 'get down.' They then seem to go away, probably to breed, and come again in diminished numbers in October. On August 6, 1908, a man and myself were mustering a paddock here when we found two eagles had got a three-quarters grown Kangaroo (*Macropus giganteus*) 'bailed up' in a corner. I told the man to keep clear and that I would return in the evening and poison the carcass of the kangaroo that I quite expected to find laid there. However, at 6 p.m., the kangaroo was still laid there, but *asleep*, flat on the ground in the open. The eagles had left it, and it seemed to have just laid down and slept the sleep of exhaustion from 8 a.m. to 6 p.m. I then went on to look at two ewes that we had left in the morning, as they could not keep up with other sheep we mustered. I found the eagles had killed both of them and picked most of the meat off them. I poisoned what was left, and going there the next morning found *six* eagles laid dead. Two of them had died on their backs and their comrades had eaten most of the breast meat from them! (cannibals). Four of the birds (not damaged) weighed 51 lbs. They measured from 7 ft. to 7 ft. 6 in. across the wings. A young male shot here, December 14, 1910, weighed 6 lbs., 6 ft. 5 in. expanse. It attacked a hen turkey with brood of young, but the mother turkey fought it in defence of her young. These eagles are very partial to Turkeys as food. On June 30, 1910, as Mrs. Carter was driving in to the township of Broome Hill, along a high road from here, two eagles were perched in trees alongside the road. Upon her approach in the buggy with pair of horses they came up, and for some distance hovered above the buggy and horses as they went along at such a low elevation that Mrs. Carter told me she could easily have struck one or both of the birds with the buggy whip, but was afraid of the consequences if one had fallen on the horses or in the buggy. In my paddocks here were two old nests of eagles, one of which was occupied (I was told) about 1900. One of them was high up in an immense Yate (?) tree, which blew down three years ago. Upon examining the nest on the ground I found numerous bones and skulls of opossums, probably from the bodies of those snared by trappers and thrown away, as these eagles certainly don't catch food at night."

As noted above, it is possible that North-western birds are smaller than those from the South-west, to which I gave the name *carteri*, though from Keartland's note, given below, they share the dark coloration.

Milligan, writing about West Australian birds (*Emu*, Vol. II., p. 70, 1902), states: "First trip.—These were observed frequently soaring and circling at great heights. An old nest was seen at Cowaramup Brook. Second trip.—Whilst walking through the peppermint belt I disturbed one in repose. By the iron-black plumage I took him to be a male adult. The aboriginal name is 'Walgil.'"

Whitlock, on the birds of the Pilbarra Goldfield, West Australia, wrote (*Emu*, Vol. VIII., p. 176, 1909): "Uncommon; a pair or two seen haunting the most secluded ranges of the upper Coongan Valley. Reported to be more numerous on the Upper de Grey. I visited one nesting-site and found two old nests, and the wreck of a female or a young bird below, the more recent. The most remarkable fact about these nests is that in each case I could touch the bottom of the structure with the barrel of my gun without climbing a foot. In each case small gum-trees had been chosen, though there were plenty of larger trees up the gully."

Crossmann, also about West Australian birds, in the *Emu*, Vol. IX., p. 86, 1909, noted: "This Eagle is unfortunately of frequent occurrence during the lambing season, and does a great deal of damage. They undoubtedly nest in the district, though I never actually found a nest. Poison gets rid of them, but they seem to require a strong dose of strychnine. One I killed measured over 6 feet across the wings."

Keartland, writing of the birds of North-west Australia in the *Trans. Roy. Soc. S.A.*, Vol. XXII., p. 166, 1898, recorded: "Although in other parts of Australia these Eagles are found of various shades of colour, from very light brown to nearly black, I never saw a light-coloured one throughout our journey. In crossing the desert they were frequently seen pursuing the little wallabies, so common on the sandhills. They generally hunted in couples. Soaring overhead, until their keen eyes detected their victim, they descended with unerring aim upon it. Several of their nests were seen in the desert gums on the sandhills, not more than twenty feet from the ground."

GENUS—HIERAAËTUS.

HIERAAETUS Kaup, Classif. Saugeth. ü Vögel, p. 120, 1844 .. .. Type *H. pennatus.*

Also spelt—

Hieraëtus Kaup, Mus. Senckenb., Vol. III., p. 260, 1845.
Hieracaëtus Agassiz, Index Univers., p. 181, 1846.
Jerœtus Kaup, Archiv. fur Naturg., 1851, p. 89.
Hieroaëtus Gray, Cat. Gen. Subgen. Birds, p. 3, 1855.
Ieraëtus Gray, Handl. Gen. Sp. Birds, Vol. I., p. 12, 1869.

Eutolmaëtus Blyth, Journ. As. Soc. Bengal, Vol. XIV., p. 174, 1845 .. .. Type *H. bonelli.*

Also spelt—

Tolmaëtus Blyth, *ib.*,Vol. XV., p. 5, 1846.
Utolmaetus Whitlock, Emu, Vol. IX., p. 190, 1910.

Butaëtus Blyth, Journ. As. Soc. Bengal, Vol. XIV., p. 174, 1845 .. .. Type *H. pennatus.*
(Not *Butaetes* Lesson, Traite d'Orn., 1830, p. 83.)

Pseudaetus "Hodgs. 1844" Bonaparte, Rev. Mag. Zool. 1854, p. 531 .. .. Type *H. bonelli.*

Asturaëtos Brehm, Naumannia 1855, p. 26 .. .. Type *H. bonelli.*

Aquilastur Brehm, Allg. Deutsche Nat. Zeit., N.F., Vol. II., p. 53, 1856 .. .. Type *H. bonelli.*

SMALL Aquiline birds with short bills, long wings, long tail, rather long feathered legs and short toes.

The bill is short with a rather large cere, in which the oval nostrils, which show internally a bony process, are perpendicularly obliquely placed; the lower edges of the upper mandible show little sinuation.

The wing is long with the first primary short, the fourth longest; the second is about equal to the sixth, while the third and fifth are subequal and little less than the fourth.

The long tail is square and more than half the length of the wing.

The legs are long, the tarsus measures about one-third the length of the wing and is feathered right down to the toes. The toes are normal, and short in comparison to the length of the tarsus.

For many years this genus was known under the name of *Nisaëtus*, but it was shown before I published my "Handlist" that that name had been proposed in connection with a different form and I then, following Sharpe, used *Eutolmaëtus*. Upon further investigation the correct name was found to be *Hieraaëtus*, which is here used, as was used by Gould in his "Handbook."

In my synonymy will be noted four generic names given to *Falco bonelli* Temminck, which is here considered as congeneric. Structurally this species agrees fairly with *Falco pennatus* Gmelin, the type of *Hieraaëtus*, but I am inclined to believe that anatomical investigation will decide that these two can be differentiated. There is really no outstanding structural characters whereby these genera can be superficially separated, and it is no use dogmatising upon skins, as everything depends upon the osteology of the species.

No. 299.

HIERAAËTUS PENNATUS.

LITTLE EAGLE.

(Plate 242.)*

Falco pennatus Gmelin, Syst. Nat., p. 272, 1788: Locality unknown.

Aquila morphnoides Gould, Proc. Zool. Soc. (Lond.) 1840, p. 161, 1841; Upper Hunter, New South Wales.

Aquila morphnoides Gould, Proc. Zool. Soc. (Lond.) 1840, p. 161, 1841; *id.*, Birds Austr., Vol. I., pl. 2, 1848; Bonaparte, Consp. Gen. Av., Vol. I., p. 14, 1850; Ramsay, Cat. Austr. Acc., p. 28, 1876; *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 177, 1878; Bennett, Ibis 1884, p. 465; Broadbent, Proc. Roy. Soc. Queensl., Vol. III., p. 24, 1887 (Q.); Ramsay, Tab. List Austr. Birds, p. 1, 1888; North, Aust. Mus. Cat., no. 12, p. 6, 1890; Witmer Stone, Austral Av. Rec., Vol. I., p. 145, 1913.

Butœtus morphnoides Blyth, Journ. As. Soc. Beng., Vol. XIV., p. 546, 1845.

Hieraëtus cristatus (not Vieillot) Blyth, *ib.*, Vol. XV., p. 4, 1846.

Hieraëtus morphnoides Gould, Handb. Birds Austr., Vol. I., p. 11, 1865; Ramsay, Proc. Zool. Soc. (Lond.) 1875, p. 578 (Q.); Orton and Sandland, Emu, Vol. XIII., p. 76, 1913 (W.A.); Barnard, *ib.*, p. 205, 1914 (N.T.); *id.*, *ib.*, Vol. XIV., p. 41, 1914 (N.T.).

Nisaetus morphnoides Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 254, 1874; *id.*, Proc. Zool. Soc. (Lond.) 1875, p. 338 (Q.); Gurney, Ibis 1877, p. 419; *id.*, *ib.*, 1882, p. 454; North, Aust. Mus. Cat., no. 4, p. 27, 1898; Hall, Key Birds Austr., p. 1, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 15, 1901; A. G. Campbell, Emu, Vol. II., p. 10, 1902 (Vic.); Le Souëf, *ib.*, p. 139, 1903 (N.T.); Carter, *ib.*, Vol. III., p. 32, 1903 (N.W.A.); Sassi, Journ. fur Orn., 1909, p. 365 (Q.); Whitlock, Emu, Vol. VIII., pp. 171, 176, 1909 (W.A.); Macgillivray, *ib.*, Vol. X., p. 18, 1910 (N.S.W.); North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 211, 1911.

Eutolmaëtus morphnoides Mathews, Handl. Birds Austral., p. 40, 1908; Howe, Emu, Vol. IX., p. 229, 1910 (Vic.); Ogilvie-Grant, Ibis 1910, p. 169 (W.A.).

Utolmaëtus morphnoides Whitlock, Emu, Vol. IX., p. 190, 1910 (W.A.).

Aquila morphnoides morphnoides Mathews, Nov. Zool., Vol. XVIII., p. 248, 1912.

Aquila morphnoides coongani Mathews, *ib.*, Coongan River, West Australia.

Hieraaetus morphnoides morphnoides Mathews, List Birds Austr., p. 106, 1913.

Hieraaetus morphnoides coongani Mathews, *ib.*

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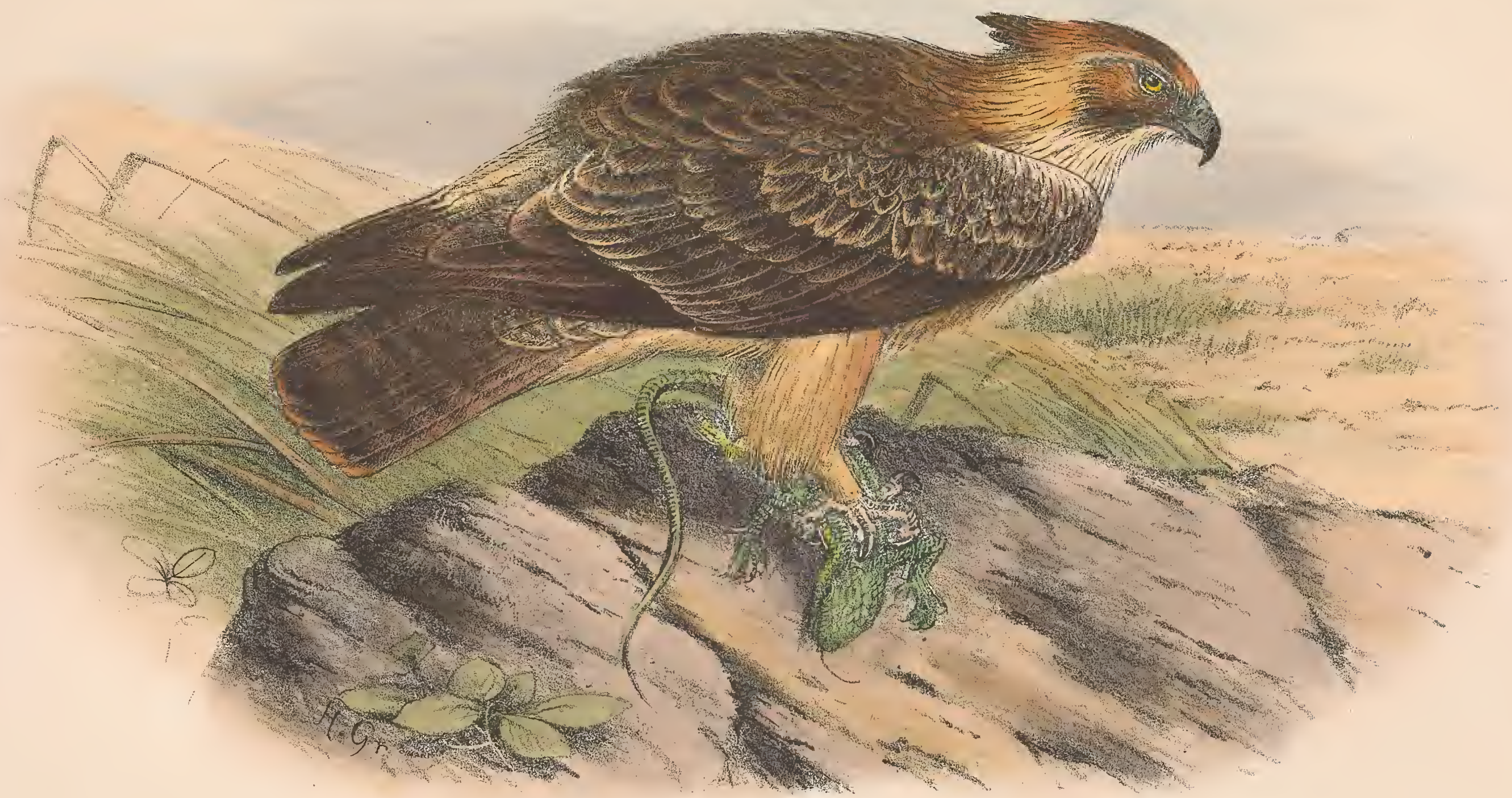
* The Plate is lettered *Eutolmaëtus morphnoides.*



H. Grönvold. del.

Witherby & C°

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EUTOLMAËTUS MORPHNOIDES.

(LITTLE EAGLE).

LITTLE EAGLE.

Range. Australia, but not Tasmania.

Adult female. Back, wing, scapulars and tail brown, varying from buffy-white to almost black; edge of wing white with dark centres to the feathers; lesser and median upper wing-coverts earth-brown, becoming paler on the greater series which have the tips buffy-white like the innermost secondaries; bastard-wing blackish with an indication of pale bars on the inner webs which are white on the inner edge; primary-coverts very similar; primary-quills blackish at the tips, inner webs for the greater part white, tinged with grey on the outer webs, and an indication of cross bars, the inner primaries much more grey with white edges at the tips, the outer secondary quills darker than the inner primaries and regularly barred; third, fourth, fifth, and sixth primaries incised on the outer webs, and the second, third, and fourth on the inner webs; rump brown; the long upper tail-coverts much paler and whitish at the tips; tail greyish-brown, with dark cross bars, white mottlings on the inner webs, and pale tips to the feathers; crown of head and nuchal crest dark brown with pale edges to the feathers; fore-head, sides of face, sides of neck, occiput, and hind-neck tawny with dark shaft-streaks to the feathers; eyelids, a narrow line over the eye, and a broad moustachal streak below it black; the short feathers on the bare space below the eye dull white; throat and under-surface creamy-white with dark shaft-lines to the feathers and tinged with buff, becoming rufous-brown on the sides of the body and flanks; under wing-coverts creamy-white with dark centres to the feathers. Bill rich horn colour with black tip; eyes bright yellow; feet greyish-white. Total length 500 mm.; culmen 28, wing 377, tail 200, tarsus 65. Figured. Collected at Port Augusta, South Australia, on the 6th of October, 1911, by Captain Samuel White.

Adult male. Seems darker, especially on the under-surface. Wing 343 mm., culmen 22, tarsus 65. Collected on Isis Downes, Barco River, Queensland, on the 6th of December, 1881.

Another bird collected at the Coongan River, Mid-west Australia, on the 7th of July, 1908, is very similar to the above in coloration. Wing 334 mm., culmen 23, tarsus 59. These birds vary too much to denote subspecies on the series I have, but later my "*coongani*" may have to be admitted.

A specimen collected in the Northern Territory belongs to the dark variety noted by North, and has the whole of the upper-surface very dark, almost black, and the under-surface tawny red with black shaft stripes. This form has been described by North as rare in New South Wales, though it is the one described and figured by Gould who procured his specimen in New South Wales. It appears to be more common in certain localities, but as the young are dark coloured it is difficult to determine exactly the status of this form. It is not geographical, and it is also not a dimorphic stage, but would appear to be a reversionary sport; that is, old birds retain the immature plumage under certain conditions.

Nestling covered with creamy-white down. (North.)

Young. "Two months old. Crown of the head, nape and hind-neck rufous, with blackish centres to some of the feathers of the crown of the head and nape, and having short white down on the fore-head and centre of hind-neck, the remainder of the plumage of the upper-parts almost similar to that of the adult male; throat and sides of neck covered with short creamy-white down, and which is also intermingled with the rufous-coloured plumage of the remainder of the under-surface, the abdomen and thighs being a clear fawn colour. A month later the down has been shed; the eyelid is blackish, as is also a narrow line of feathers above and below the bare skin surrounding the eye; the feathers of the upper-parts are pale rufous, those of the under-breast having narrow blackish shaft-lines. In this stage of plumage the under-parts are darker than in the adult." (North.)

Nest. A large structure made of sticks and lined with leaves. Outside measurements : 30 inches by 20 deep ; inside 8 inches by 3 deep.

Eggs. Clutch one, sometimes two. Bluish-white, sparsely marked, sometimes very faintly with reddish-brown spots. Axis 54 to 58 mm. ; diameter 45 to 46 (Queensland).

Breeding-season. August to November.

This bird does not seem to have been differentiated until Gould's time, but simply lumped in with "Hawks" or "Eagles," more probably with the former on account of its small size.

Captain S. A. White, from South Australia, has written me: "The Little Eagle is confined to our northern country and is seldom seen down south. It is a timid bird and seems to shun the presence of man—at least that has been my experience. I have never seen these birds in the act of building a nest (though I have seen many in the act of nidification), but have a strong feeling that they take possession of old nests built by crows, etc."

Mr. T. P. Austin from Cobbora, New South Wales, states: "Seldom seen here; the first one which came under my notice, my attention was attracted to it by its peculiar note, which I afterwards discovered it keeps up nearly the whole day long. While I was watching it, it suddenly swooped down upon a young rabbit sitting upon a burrow, quite close to where I was sitting upon my horse. Although it did not catch the rabbit, I saw the fur fly in the wind, and the rabbit disappeared most suddenly beneath ground with a loud squeal. After watching the bird for a few minutes it went to its nest, which was then only partly built, and from which I eventually took a single egg, and shot both birds. The following year another pair of these birds came to the same clump of trees and reared a single young one in an old Raven's nest built in a tree not more than one hundred yards from the one which contained the other nest, and these are the only occasions upon which I have seen this species in this district."

Gould, in 1865, wrote: "Since my discovery of this species on the Upper Hunter in 1839 but few examples have been obtained, and it is still an exceedingly rare bird in the collections of Europe," and enumerates less than half a dozen specimens.

In 1875, Ramsay (*Proc. Zool. Soc.* (Lond.) 1875, p. 578) endorsed this: "This rare and interesting species is by no means easily obtained; a few specimens have visited the coast-range near the heads of the Herbert River and on the table lands. Mr. J. B. White procured several fine specimens of both sexes at Springsure and on the Barkoo River, and it is also found about 100 miles inland from Rockhampton. The sexes differ considerably in size, and individuals of both sexes vary in the colour and intensity of the plumage, some being of a rich dark rufous or rusty-brown, others light buff (almost white) on the abdomen, pale rusty-brown on sides of chest and flanks, a stripe of blackish-brown down centre of each feather; the sexes and individuals of the same sex also differ greatly in size. A small male in the Dobroyde Collection measures: total length 16.5 inches; bill from fore-head along the culmen 1.4, from cere along culmen 1.2, from cere to tip 1.1; wing 13, tail 7.8, tarsus 2.3. A female in the Australian Museum, total length 22 inches, wing 15.85, tail 9.8, bill 1.4, culmen 1.7, tarsus 2.8."

Howe (*Emu*, Vol. IX., p. 229, 1910), in the Mallee, Victoria, noted: "When working along a pine ridge on the 3rd October, my attention was attracted by calls very like those of the Stone Plover, and on approaching the spot I flushed one of these fine birds from the ground. The nest, with the female sitting, was found close by in a Murray pine about 25 feet up and contained a fresh egg. A week later it was again looked at and the egg taken: the female was again flushed."

This bird does not seem to be uncommon in the Region of the Barrier Range from Macgillivray's notes (*Emu*, Vol. X., 1910), thus: "p. 18. A few yards more tramping along the sandy bed brought us to a nest of the Little Eagle, situate in a gum-tree. The nest had been partly blown out of position by a storm and built up again to a height of 2 feet. . . . p. 20. A pair of Little Eagles had a nest ready for occupation in a tree near our camp. . . . Another Little Eagle was flushed, and flapped slowly away from a nest high up as usual, to which she had evidently been putting the finishing touches. . . . In a tree near by a Little Eagle had nearly finished a nest. Unlike the Whistling Eagle, this species has little chance of re-occupying an old nest, as the site usually chosen, a slender limb at the top of a tree, does not tend to its survival from year to year in a region where winds are high and frequent. . . . p. 22. Several pairs of Little Eagles were also noticed among the trees or flying overhead. . . . p. 23. In the next tree a Little Eagle was building. . . . p. 29. A Little Eagle was disturbed from a newly-finished nest. . . . p. 100. A Little Eagle flew from a nest high up in a gum (two eggs). . . . p. 102. Two Little Eagles' nests contained one and two eggs respectively."

In the *Austr. Mus. Spec. Cat.*, no. 1, Vol. III., North again has a good account, and the first I quote is Macgillivray's writing as confirmation of the above: "The Little Eagle is found quite commonly along all the creeks which intersect the open country (Broken Hill, N.S.W.). It is a quiet and inoffensive bird, subsisting almost wholly upon rabbits now that that rodent has displaced all the smaller native animals. It is not easily alarmed, and sitting in a tree will allow of a close inspection, but on too close an approach flaps slowly away. It is often seen soaring high in the air, especially on a fine summer's day: the wings then are not outstretched to the same extent as those of the

Wedge-tailed Eagle or Kite. The only cry I have heard it utter is a plaintive piping one, and then only when persecuted by Crows ; at all other times it is silent." Mr. H. G. Barnard's observations in the same place read: "The food of the Little Eagle consists chiefly of various reptiles, principally Frilled Lizards, of which some very large ones are killed, the male bird carrying them to the nest to feed the female while sitting, generally about sundown, then flying away to roost in a tree some distance off." Mr. K. H. Bennett contributed the following: "*Aquila morphnoides* is very restricted in its habitat in the Lachlan River District of New South Wales. I have never met with it south of that river, and only over a distance of about sixty miles to the north, its home appearing to be the wide open plains, dotted with occasional belts and clumps of timber, although it is by no means numerous even there. Though somewhat inactive in habits, it is extremely shy and wary, the male being more difficult to obtain than the female. The only way I could procure specimens was to secrete myself carefully within gunshot of the nests, and await the return of the birds. Its powers of flight, although strong, are by no means swift, and its prey, which consists of various small mammals, reptiles, and young birds, such as Crows, Magpies, etc., is almost always captured by watching and suddenly pouncing upon them. Like *Aquila audax*, it is very destructive to rabbits, which animal it watches with the utmost patience." North adds: "The late Mr. K. H. Bennett's remarks about the shy and wary habits of the male is borne out by the adult specimens in the Australian Museum Collection, of which there are twelve females and only two males."

A lot of nesting-notes are given by North in the same place.

As regards the species-name to be used for this bird, I find no previous recognition of any save *morphnoides*, but Gould himself wrote: "The Little Australian Eagle, which is about the size of the Common and Rough-legged Buzzards (*Buteo vulgaris* and *Archibuteo lagopus*) forms a beautiful representative of *Hieraëtus pennatus* of Europe, its specific distinctions from which are its larger size, the total absence of the white mark on the shoulder, and the cere and feet being of a lead colour instead of yellowish-olive."

Gurney, in the *Ibis* 1877, p. 419, wrote: "The Dwarf Eagles, *N. pennatus* and *N. morphnoides*, two species which form the subgenus *Hieraëtus* of Kaup, and which, perhaps, might properly be kept distinct under that designation. . . . To Mr Sharpe, ornithologists are indebted for pointing out an excellent criterion for distinguishing this Eagle (*pennatus*) from its nearly allied Australian congener, *N. morphnoides*, in the fact that in the latter, and not in the former, the under-surface of the primaries is conspicuously 'barred throughout with greyish buff.'"

However, in the *Ibis* 1882, p. 454, Gurney recorded a specimen from the Astrolabe Mountains, New Guinea, as *N. morphnoides*, commenting upon its small size and slight differences in coloration.

Examination of the New Guinea bird, which is obviously only subspecifically separable from the Australian one, shows that it differs more superficially from the latter than the latter does from typical *pennatus.* Consequently, as might be concluded from Gould's and Gurney's remarks, the Australian bird can only be regarded as subspecifically distinct from *pennatus,* which must come into use for the species-name.

The different forms of the Palæarctic fauna will have been discussed by Hartert in his *Vögel Palaarkt. Fauna,* but I have not seen the part covering this bird. I therefore simply regard all the Palæarctic birds as

Hieraaëtus pennatus pennatus Gmelin.

Falco pennatus Gmelin, *Syst. Nat.,* p. 272, 1788, was based entirely on Brisson, who described the bird from an unknown locality. In Dr. Hartert's work a definite locality will be accurately given and consequently I do not designate such.

The New Guinea form will bear the name

Hieraaëtus pennatus weiskei Reichenow.

In the *Ornith. Monatsber.,* Vol. VIII., p. 185, 1900, Reichenow named the bird from S.E. New Guinea *Eutolmætus weiskei,* confirming the distinctions first pointed out by Gurney, but there minimised. The Australian birds I class under the name

Hieraaëtus pennatus morphnoides Gould.

I separated the Western form under the name *Aquila morphnoides coongani,* but longer series show so much variation and the plumage-changes seem to be misunderstood, so that I withhold recognition for the present.

In the British Museum I observe the following differences in the forms.

A specimen of typical *weiskei,* compared with an Indian specimen of *pennatus,* shows the under-surface to agree exactly in marking, the broad brown feather stripes of *weiskei* which distinguish it at sight from *morphnoides* being accurately seen. The upper-surface, however, in these two specimens disagrees vividly. *Weiskei* has the whole tone darker, but the head is blackish-brown with no rust coloration showing. The head and neck at the back in *pennatus* is rusty, with the centre of the feathers brown: the primaries in *weiskei* have white bases, but in *pennatus* they show no white but deep grey only; the tail shows the barring more distinctly in *weiskei* than in *pennatus.*

A Queensland specimen of *morphnoides* can be matched as to the colouring of the under-surface with the narrow shaft-streaks exactly by a specimen of *pennatus* from Futteguhr, India. When the upper-surface of these two specimens be examined, that of the Queensland bird is seen to be only very slightly darker, save on the head and neck. In the Indian bird this is pale rusty, with more or less pronounced brownish-black centres to the feathers: the Queensland bird has most of the feathers on the top of the head wholly brownish-black, the sides of the head and the back of the neck much deeper rufous. In the *pennatus* the primaries are as in the previous specimen of *pennatus*, but in *morphnoides* the base of the primaries is whitish, more or less barred or mottled with grey. In *morphnoides* also the tail shows the barring a little more distinctly.

From this Queensland specimen of *morphnoides* a bird from Clifton Downs, Carnarvon, West Australia, shows a lot of difference, being everywhere paler, the top of the head and back of the neck being as pale as in the last described *pennatus*, but a few wholly brownish feathers instead of the regular striping differentiate these. The wing shows the whitish basal patch of the primaries, and the tail shows the barring, but these are, as Sharpe and Gurney observed, the chief characters.

However, that these are of only subspecific value can be seen in a specimen of *pennatus* from Satti, which shows the base of the primaries becoming lighter, and in one feather distinct white barring is noted.

It will be noted that these comparisons have been made with Indian specimens of *pennatus*, not European, and that they all refer to the pale-breasted form, which seems to be the adult plumage. North seems to be of the opinion that the dark-breasted birds are mature, as he writes: "Of no species of the Australian Accipitres is there so wide a difference in colour, for it may either have the under-parts, especially the females, pale fawn colour, or faint creamy-white, with brown or blackish shaft stripes on the upper-breast, or brown or rufous brown, with conspicuous blackish central streaks to the feathers, the head and nape too being very much darker in this variety." He then notes that ten specimens collected by Bennett in New South Wales all agree, while two dark are from West Australia and another dark one from Queensland. As it seems possible that my "*coongani*" will later have to be accepted, I keep separate the field-notes referring to the Western birds, which here follow.

Whitlock, writing from Marble Bar, West Australia, in the *Emu*, Vol. VIII., p. 171, 1909, relates the following experience: "I had several Hawk's nests under observation along that creek. The first was a nest of the Little Eagle (*Nisaëtus morphnoides*) at the top of a big spreading gum-tree.

The nest was about 55 feet above the bed of the creek and on rather a thin limb. However, the morning was calm, and I determined to try to scoop the eggs from the nest. With the aid of a fallen dead limb, and by cutting steps with a tomahawk, I reached the first branch, when down fell the scoop. I would not climb down that thick trunk again, so up I went, minus the scoop, until I could see right into the nest, which was on a horizontal limb of not too thick dimensions. I was determined to have those two eggs, so worked my way cautiously along the limb until the critical moment came. I had to let go both hands and lean forward to grab the eggs. Fortunately the day was calm, and I got both eggs and myself safely down the tree. They are a perfect clutch, almost unspotted, and more pointed than the Irwin River specimens. The nest was about 2 feet in diameter, with a fairly deep cavity, lined with green eucalyptus leaves."

This was followed (p. 176) by the following full account: "The favourite haunt of this species is near the permanent pools on the numerous rivers and creeks which are such a feature of the Pilbarra district once the hilly country is reached. On the upper Coongan, south of Marble Bar, were several pairs, but each pair seemed to restrict its wanderings within certain limits, and I never observed more than one pair on the wing at the same time. This Eagle, once identified, is easily recognised afterwards. Apart from its peculiar cry, the contour of the extended wings is very distinct from that of other birds of prey of the same size. The anterior margin of each wing forms a crescent. In flight, too, the primaries are separated at the tips. The cry is a succession of seven rapidly-uttered notes on an ascending scale, followed by a shrill and sustained 'Pĕw-ū-ū.'

"The birds probably pair for life, and one is seldom seen without the other. It is a wary species, and even at the nest is difficult to approach closely. All of the four nests discovered on the Coongan were built at a considerable height, and in each case the most massive eucalypt was chosen. The nests, too, were in every case built on a horizontal branch at some distance from the centre of the tree. The first one I robbed was at a height of 45 feet from the bed of an important tributary of the Coongan. It was a fairly large and well constructed nest, the foundation consisting of sticks up to an inch or more in diameter. The cup, though shallow, was neatly formed and lined with green eucalyptus leaves. It contained two fresh eggs. With the exception of trifling nest stains, these eggs were spotless, and in colour white, with the faintest tinge of green. Whilst I was robbing the nest the parent birds perched on a dead tree some ten chains away, and made no demonstration whatever. As I had observed at a nest in another part of this State, a colony of the Tree Martin (*Petrochelidon nigricans*) was breeding in a hollow limb of the same tree. Not a hundred yards away, in a little tributary creek, a half-dead gum-tree was standing. In this tree were nests of the Marbled Owl (*Ninox ocellata*) and the Western Kestrel (*Cerchneis unicolor*), and in the bank of the creek at the foot of the tree a female Red-browed Pardalote (*Pardalotus rubricatus*) was sitting on three eggs. The second nest was in a more lofty situation, being quite 60 feet above the water of the main Coongan. The nest, as usual, was on a horizontal limb, and very difficult to reach. It was nearly twice as bulky as the previous nest, being the accumulation of several years. I employed a native to obtain the eggs for me. The nest contained two, much incubated. Unfortunately, he broke one in descending the tree. These eggs were both marked with pale rust-coloured blotches. The broken egg had the markings all massed at the smaller end. In ground-colour these eggs were of a dirty white. The third nest, found a week later near the junction of the Talga River with the Coongan—the latter river here being over half a mile in width—was at a height of not more than 30 feet. This was more due to the fact of the eucalypts on the Talga being small than of any variation in the habits of the parent birds. This nest contained a fine young Eaglet, which would have left the nest in a week or ten days. The fourth nest was on the banks of the de Grey River, a few miles from where its tributary, the Coongan, effects a junction. It was in a fairly large eucalypt, and, as I was informed by the natives who found it, in a very inaccessible position, owing to its being placed near to the extremity of a horizontal branch. I had gone down the river, as I was under the impression the nest was in that direction. Instead of coming to me and telling me of the difficulty, the climber foolishly chopped off the whole limb, in the hope that when the eggs fell out his mate below would be able to catch one or the other. I need hardly add the experiment failed. Both eggs were irretrievably ruined.

"The young Eaglet, before referred to, differed somewhat from its parents in plumage, being very rufous on the head, neck and breast, with narrow shaft lines. Cere greenish-yellow. Tarsus feathered, and the claws very long and powerful. Pattern of the wings similar to that of the adult, but the plumage generally dead black with faint greyish margins. The long feathers of the occiput were well developed, and with black tips. Feathers of the head of a deeper brown than that of under-parts. Native name of the Little Eagle, Wee-dun-ba."

Mr. Tom Carter has written me: "During my residence in West Australia one specimen only of this species has come under my notice. I shot it in April, 1900 (record wet year) at a flooded white gum-flat inland from Point Cloates. It was perched in a tree surrounded by water, watching a flock of ducks."

GENUS—BUTASTUR.

BUTASTUR Hodgson, Journ. As. Soc. Beng., Vol. XII., pt. I., p. 311, 1843 .. .. Type *B. teesa.*

Poliornis Kaup, Classif. Saugeth. u Vögel, p. 122, 1844 .. Type *B. teesa.*

Buteopernis Jameson, Calcutta Journ. Nat. Hist., Vol. I., pp. 319, 320, 1841 ; nomen nudum.

Pernopsis Bonaparte, Rev. Mag. de Zool. 1850, p. 481 .. Type *B. teesa.*

Bupernis "Hodgs." Gray, Cat. Gen. Subgen. Birds, p. 4, 1855 (in synonymy) .. .. Type *B. teesa.*

Valeria "Boie M.S.S." Gray, Cat. Gen. Subgen. Birds, p. 4, 1855 (in synonymy) .. .. Type *B. teesa.*

SMALLEST Aquiline birds with short bills, long pointed wings, long tail, long unfeathered legs and short toes.

The bill is small with a large cere: the nostril is a rather oblique rounded aperture with no internal bony tubercle.

The wings are long and very pointed, the feathers narrow; the first primary is short, but comparatively long and narrow; the third is longest, the fourth almost equal, but both much longer than the second, which is about equal to the fifth, and longer than the sixth: the last exceeds the first and seventh, which are subequal.

The tail is long and even, more than half the length of the wing.

The legs are long and unfeathered; the tarsus is entirely covered with reticulate scales which are larger on the front and back and obscurely recall transverse scutes: it is more than one-third the length of the tail.

The feet are small, the middle toe little more than half the length of the tarsus.

This peculiar form, which I do not admit as a legitimate constituent of the Australian Avifauna, has not yet been correctly placed, as it is obvious that it is out of place between the Little Eagle and the Sea Eagle.

Pycraft suggests it would be included in the Buteoninæ, but that appears to be a mere guess from the composition of the genus-name. In the same place, it will be noted, Pycraft recorded: "*Haliaëtus*, there can be little doubt, has nothing to do with the Eagles." *Pernis* is placed in the subfamily

Perninæ, between the Elaninæ and the Milvinæ (which includes the Sea Eagles), and it will be seen from the synonymy that superficially this bird has recalled *Pernis* to three authorities, viz., Jameson, Bonaparte and Hodgson, as these almost simultaneously proposed for it the names *Buteopernis, Pernopsis* and *Bupernis.*

Probably anatomical investigation will here provide a surprise, as in many other places in connection with this group.

BUTASTUR TEESA.

WHITE-EYED BUZZARD.

CIRCUS TEESA Franklin, Proc. Zool. Soc. (Lond.) 1831, p. 115: between Calcutta and Benares, India.

Circus teesa Franklin, Proc. Zool. Soc. (Lond.) 1831, p. 115.

Astur hyder Sykes, Proc. Zool. Soc. (Lond.) 1832, p. 79: Dukhun, India.

Butastur teesa North, Rec. Austr. Mus., Vol. III., p. 87, 1898: Lithgow, New South Wales; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 16, 1901; Hall, Key Birds Austr., 2nd ed., p. 114, 1906; Mathews, Handl. Birds Austral., p. 41, 1908; *id.*, Nov. Zool., Vol. XVIII., p. 248, 1912; *id.*, List Birds Austr., p. 106, 1913; *id.*, Austral Av. Rec., Vol. II., p. 106, 1914.

HABITAT. India.

DESCRIPTION. Upper-parts brown with a rufous tinge and black shaft-streaks, a small white nuchal patch showing through the bases of the feathers. Upper wing-coverts mottled and obscurely barred with white. Primaries greyish-brown above with black tips and white on the inside towards the base, forming a distinct white wing-patch. Tail rufous above with grey tips and blackish subterminal band, and in closed tail two succeeding bars are indistinctly seen; the outer tail feathers are greyish on inner web, becoming white towards base and bearing about five indistinct blackish bars.

Throat cream with brown central line and brown outside lines bordering the cheeks. Breast brown with dark shaft-lines and whitish mottlings, the latter becoming predominant on the abdomen, the lower tail-coverts being unbarred; the thighs are creamy with very small indistinct rufous-brown bars. Cere orange; tip of bill black; irides pale yellowish-white; legs and feet dirty orange-yellow. Total length about 380 mm. in skin; wing 285, tail 170, culmen 26, tarsus 60, middle toe without claw 35 mm.

THE above description of the genus and species should suffice for recognition should this bird occur again in Australia.

When North added this species to the Australian List, he wrote: "Some time ago Mr. Richard Grant, of Lithgow, presented a skin of *Butastur teesa* to the Trustees (of the Australian Museum, Sydney), accompanied by the following note: 'With regard to this Hawk, I shot it in a ring-barked tree near the Bowenfels Road, Lithgow. I do not know the exact date, but as near as I can remember it was in November 1889. I skinned it, also some Brown Hawks that I shot the same day, and partly filled the skins out and put them away. I took no further notice of them until my brother returned home and drew my attention to this bird's plumage.' Lithgow is situated in a valley of the Blue Mountains, 3,007 feet above the level of the sea, and ninety-six miles west of Sydney. *B. teesa*, the White-eyed Buzzard-Eagle, is very abundant in some parts of India, which is the habitat of this species, but I can find no record of its having been obtained on any of the Islands lying between India and Australia. *B. liventer*, which occurs in Java and Timor, or *B. indicus* inhabiting Borneo, Sumatra, and the Philippines, I should not have been so much surprised at obtaining on the Australian Continent."

I would not recognise this as a record worth upholding without further specimens, as the improbability of an Indian bird reaching Lithgow is very great. Upon examination of the specimen, when I was recently in Sydney, I noted that there is no original label on, as would be surmised from North's account above quoted, but on the label is written, apparently by North: "Mr. Robert Grant informs me his brother shot this bird about three years ago at Lithgow, N.S.W."

In view of the discrepancy between this and the published account, without throwing any doubt upon the bona-fides of the two Grants, I consider that this record should be placed upon a hypothetical List to await confirmation, as recorded in the *Austral Av. Rec.*, Vol. II., p. 106, 1914, written upon my return from Australia.

GENUS—CUNCUMA.

CUNCUMA Hodgson, Journ. As. Soc. Beng., Vol. VI., p. 367, 1837 .. .. Type *C. leucorypha.*

Pontoaëtus Kaup, Classif. Saugeth. u Vögel, p. 122, 1844 Type *C. leucorypha.*

Also spelt—
Pontaëtus Kaup, Mus. Senckenb., Vol. III., p. 261, 1845.

Blagrus Blyth, Cat. Birds Mus. As. Soc. Beng., p. 30, 1852 Type *C. leucogaster.*

LARGE Aquiline birds with comparatively long bills, long wings, long tail, long partly-feathered legs and stout feet.

The bill is long for this group, but really short, with a large cere; the lower edges of upper mandible are sinuate; the nostril is nearly circular and not covered by the loreal bristles, though they advance forward and cover part of the cere.

The wing is long with the first primary short, but of medium length for this family, and longer than the seventh; the third is longest but does not exceed the fourth much, while neither of these much surpass the second and fifth.

The tail is long, but is slightly less than half the length of the wing: it is wedge-shaped, but not strongly.

The legs are long; the tarsus measures about one-third the length of the wing; the feathers of the tibia advance about one-third down the length of the tarsus in front, but not behind. There are large coarse scutes seen on the front of the tarsus which is otherwise covered with reticulate scales, a few of which are larger on the back and resemble scutes.

The feet are stout but rather small, the middle toe being noticeably less than the tarsus.

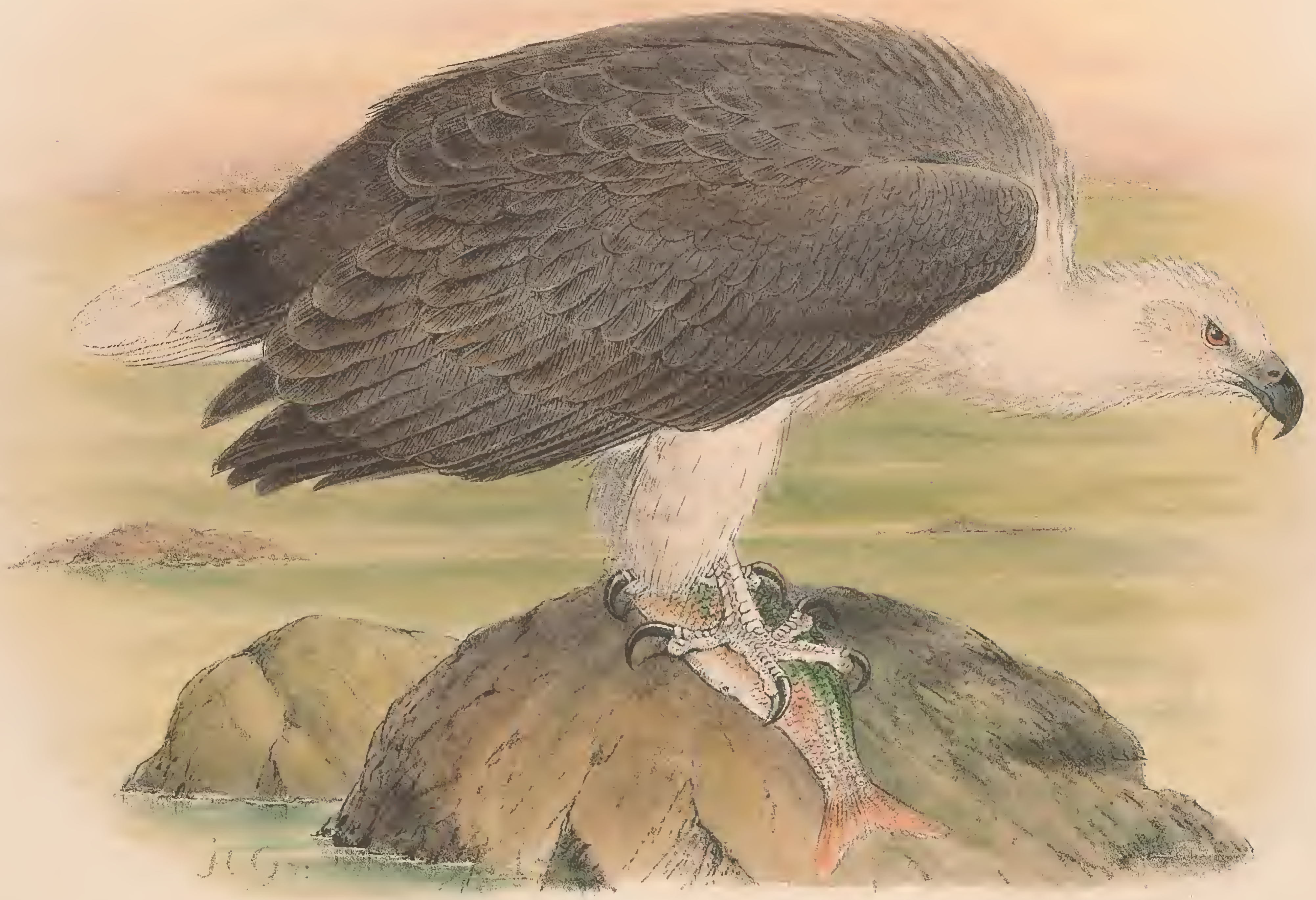
This genus has been merged in *Haliaeëtus,* but there are differences to be seen in the bill, wing and feet, and consequently I use *Cuncuma* based on Pallas's *leucorypha.*

Blanford, in the *Fauna Brit. India Birds,* Vol. III., p. 367, 1895, dealing with *leucoryphus,* which he placed in *Haliaeetus,* wrote: "This bird is the type of *Cuncuma* of Hodgson, a name wrongly applied by some writers to *H. leucogaster.* It is a question whether the present form is not entitled to generic distinction."

I have been unable to see superficial characters which would justify the separation of *leucoryphus* and *leucogaster*, though it is quite possible that anatomical investigation would confirm Blanford's suggestion.

When *leucogaster* is compared with *Haliaeetus*, however, the nostril in the latter is seen to be perpendicularly elongate and partly covered by an operculum ; the wing has the first primary only equal to the seventh, the second less than the third, fourth and fifth, which are subequal, though longer than the sixth: really the wings are more different than would be concluded from these details. The legs and feet are very different, the tarsus being covered with feathers for about three-quarters of its length, and the feet being large and strong: the tarsus is comparatively shorter and the middle toe longer, the latter exceeding the former in length.

It seems doubtful to me whether *Haliaeetus* is the nearest relative to *Cuncuma*, but here again it is impossible to do much without a good knowledge of the osteology; superficial features seem of little value, and the only point is that such differences as may be easily seen denote greater distinction than might at first be imagined.



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HALIAËETUS LEUCOGASTER.

(*WHITE - BELLIED SEA - EAGLE*).

Order FALCONIFORMES *Family AQUILIDÆ.*

No. 300.

CUNCUMA LEUCOGASTER.

WHITE-BELLIED SEA-EAGLE.

(PLATE 243.)*

FALCO LEUCOGASTER Gmelin, Syst. Nat., p. 257, 1788: Loc. unk.=New South Wales.
White-bellied E(agle), Latham, Gen. Synops. Birds, Vol. I., p. 33*, 1781.

Falco leucogaster Gmelin, Syst. Nat., p. 257, 1788; Latham, Index Ornith., Vol. I., p. 13, 1790.

Haliaeetus leucogaster Vigors, Zool. Journ., Vol. I., p. 336, 1824; Gould, Synops. Birds Austr., pt. III., pl. 39, 1838; Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 307, 1874; Ramsay, Cat. Austr. Acc., p. 30, 1876; *id.*, Proc. Linn. Soc. N.S.W., Vol. I., p. 369, 1877; Gurney, List Diurn. Birds Prey, p. 113, 1884; Broadbent, Proc. Roy. Soc. Queensl., Vol. I., p. 93, 1884 (Q.); Legge, Papers and Proc. Roy. Soc. Tasm. 1886, p. 237, 1887 (Tasm.); *id.*, *ib.*, 1887, p. 84, 1888 (Tasm.); Ramsay, Tab. List Austr. Birds, p. 1, 1888; North, Austr. Mus. Cat., no. 12, p. 7, 1890; *id.*, *ib.*, no. 4, p. 31, 1898; Keartland, Trans. Roy. Soc. S.A., Vol. XXII., p. 166, 1898 (N.W.A.); Hall, Key Birds Austr., p. 1, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 16, 1901; Hall, Vict. Naturalist, Vol. XVIII., p. 165, 1902 (W.A.); Le Souëf, Emu, Vol. II., p. 140, 1903 (N.T.); Carter, *ib.*, Vol. III., p. 32, 1903 (N.W.A.); Berney, *ib.*, Vol. V., p. 16, 1905 (N.Q.); Hartert, Nov. Zool., Vol. XII., p. 208, 1905 (N.T.); Batey, Emu, Vol. VII., p. 2, 1907 (Vict.); Cornwall, *ib.*, p. 112, 1908 (Q.); Austin, *ib.*, p. 177, 1908 (Q.); Maclaine, *ib.*, p. 191 (Tasm.); Mathews, Handl. Birds Austral., p. 41, 1908; Gibson, Emu, Vol. VIII., p. 64, 1908 (W.A.); Ogilvie-Grant, Ibis 1910, p. 169 (W.A.); Littler, Handb. Birds Tasm., p. 6, 1910 (Tasm.); Mathews, Emu, Vol. X., p. 108, 1910 (N.W.A.); Campbell and White, *ib.*, p. 195 (Q.); Hill, *ib.*, p. 266, 1911 (N.W.A.); Barnard, *ib.*, Vol. XI., p. 21, 1911 (Q.); North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 215, 1911; Macgillivray, Emu, Vol. XIII., p. 150, 1914 (N.Q.); Barnard, *ib.*, Vol. XIV., p. 41, 1914 (N.T.).

Haliaetus sphenurus Gould, Synops. Birds Austr., pt. III., pl. (39), 1838: Tasmania; *id.*, Proc. Zool. Soc. (Lond.) 1837, pp. 97, 138, 1838; Witmer Stone, Austral Av. Rec., Vol. I., p. 145, 1913.

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* The Plate is lettered *Haliaëetus leucogaster.*

Ichthyaëtus leucogaster Blyth, Journ. As. Soc. Beng., Vol. XI., p. 110, 1842; Gould, Birds Austr., Vol. I., pl. 3, 1848; Ramsay, Ibis 1865, p. 83 (Q.); Diggles, Orn. Austr., pt. v., pl. 2, 1866.

Pontoaëtus leucogaster Gray, Genera Birds, Vol. I., p. 18, 1845.

Cuncuma leucogaster Gray, List Birds Brit. Mus. Acc., p. 24, 1848; Bonaparte, Consp. Gen. Av., Vol. I., p. 15, 1850; Mathews, List Birds Austr., p. 107, 1913.

Blagrus leucogaster Blyth, Cat. Birds Mus. As. Soc. Bengal, p. 30, 1852.

Polioœtus leucogaster Gould, Handb. Birds Austr., Vol. I., p. 13, 1865; Ramsay, Proc. Zool. Soc. (Lond.) 1875, p. 578.

Haliaeetus leucogaster leucogaster Mathews, Nov. Zool., Vol. XVIII., p. 248, 1912.

Haliœtus leucogaster pallidus Mathews, *ib.*, Derby, North-West Australia.

DISTRIBUTION. Australia; Tasmania. Extra-limital.

Adult female. General colour above, including the back, wings and base of tail hoary grey, with dark shaft-lines to the feathers; some of the proximal lesser upper wing-coverts have an indication to white edges; some of the median and greater upper wing-coverts, scapulars and innermost secondaries are brown at the ends and void of the frosty-grey appearance; primary-quills inclining to black at the tips, the second to the sixth incised on the outer web; base of tail blackish-brown; head and neck all round and entire under-surface including the axillaries and lesser and median under wing-coverts white with dark shaft-lines to the feathers on the nape, hind-neck, breast, sides of body, axillaries, and under wing-coverts, some of the latter grey, or mottled with grey, the greater series uniform grey at the tips; iris brown, cere leaden brown; tarsi and feet white; bill brown, tip blackish brown, base leaden-blue. Total length 780 mm.; culmen 44, wing 572, tail 260, tarsus 87.

Adult male. Similar to the adult female.

Nestling covered with white down.

Immature. Upper-surface brown, the feathers with lighter tips: back and rump darker than head, though tips lighter, making more contrast. Wings brown; primaries freckled with whitish towards their bases: secondaries similarly marked; upper wing-coverts lighter with conspicuous whitish tips: under-surface rufous brown, the feathers white-tipped: under wing-coverts white mottled with brown; tail above white freckled with brown, tips white: under freckling more pronounced.

Nest. A large structure composed of sticks and lined with leaves, placed in trees, but when these are not available, on a projecting rock. Outside measurements: 5 feet wide by 3 deep; inside 12 inches by 3 or 4 deep.

Eggs. Clutch two; white, slightly glossy. Axis 70-72 mm.; diameter 51-55.

Breeding-season. June to August (usually).

LATHAM, in the *General Synopsis of Birds*, Vol. I., p. 33*, 1781, described a N(ew) S(pecies) of Falcon under the name, "White-Bellied E(agle)," as follows: "Length two feet nine inches. Bill brownish-yellow, large, and aquiline; head, neck, breast, belly, thighs, and vent white; back, wings, and tail dark brown, except the end of the last, which is white for about three inches; the legs are yellow and very stout; the claws black.

"This bird was brought to *England* in one of the last circumnavigating ships, and is now in the *Leverian Museum*. Its native place unknown."

Upon this account is entirely based *Falco leucogaster* Gmelin, *Syst. Nat.*, p. 257, 1788.

In the *Nov. Zool.*, Vol. XVIII., p. 248, 1912, I designated as the type-locality New South Wales, and here detail the reasons for this action.

The "circumnavigating ships" referred to mean those under Captain Cook, and the most probable place where these would meet with this bird, whose range is from India through the Malay States to Australia, is New South Wales. This conclusion is confirmed by the reference by Latham under Sea E(agle), p. 31, thus: "was also met with in *Botany Island* by *Captain Cooke*." The bird here signified must have been a specimen of this species, and I find that my opinion agrees with that expressed by Sharpe (*Hist. Coll. Nat. Hist. B.M.*, Vol. II., p. 90, 1906), who, dealing with the birds mentioned by Latham as being in the British Museum, wrote as follows:

"Sea-Eagle, p. 30 (=*Haliaëtus albicilla* [L.]). 'This species was also met with in *Botany Island* by Captain Cook.' The bird observed by the latter must have been an immature *Haliaëtus leucogaster*."

The *Botany Island* here referred to would appear to be *Botany Bay*, and it is quite possible that the specimen in the Leverian Museum was the identical one noted by Captain Cook. Under these circumstances I was justified in making this selection for a type-locality, as otherwise there was absolutely no data to get hold of.

When a figure was seen in the Watling Drawings Latham did not recognise it.

Captain S. A. White writes: "I have met with these fine birds along the coast of Queensland and New South Wales. A few pairs were to be found some years ago on the South Australian Coast: one pair had possession of a part of the North Coast of Kangaroo Island for many years; they seem to take possession of a certain beat and nest year after year in the same place, just renovating the old structure which is placed on some projecting rock on the coast or in some instances in a tree that is growing close to the cliffs. These fine birds were observed on the Capricorn Group: each island, be it large or small, had its pair of birds. On some islands they were nesting in the largest Pisonia tree; in one instance the nest was over 50 feet from the ground. On other islands the nest was a large stick structure, placed on quite low vegetation. The young for the first year resemble the Wedge-tailed Eagle (*Uroaëtus audax*) most strikingly in colour. The favourite food of these birds on the Queensland coast seems to be sea-snakes. Although hundreds of thousands of Noddy Terns were nesting all round the Sea-Eagles I never once saw the latter molest the terns in any way."

Mr. T. P. Austin's note reads: "I had splendid opportunities of seeing this species while upon an eight days' sailing trip to many of the islands off Mackay, North Queensland, during November, 1907. One pair of birds appeared to have their home on nearly every island, and although they had then finished breeding, I saw their old nests, some of which were huge structures. I have a pair of eggs in my collection which were taken by Mr. Sep Robinson on Molly Station, at the Macquarie River Marshes, New South Wales, on July 16th, 1906; this is about three hundred miles inland. Mr. Robinson informed me that for many years two pairs of these birds used to breed there, but eventually one pair were shot. The nest was a very large structure of sticks, placed in a very large red gum-tree growing within a hundred yards of the swamp."

Berney wrote of the Richmond District, North Queensland, as follows (*Emu*, Vol. V., p. 16, 1905): "My only experience of these noble birds was during the summer of 1902-3. One showed up 21st November, and my next record is the middle of December, when a pair took up their quarters near my camp and remained with us through the summer. I saw the last of them on 2nd April. They must have been considerably out of their latitude out here: their presence, I expect, was due to the very severe drought from which we were suffering at the time. Waterholes in the Flinders that had the reputation of being permanent were going dry, with the result that large numbers of fish were dying—fish of 20 and 30 lbs. weight—and, drifting to the shore, became stranded there, and I think food for the Sea-Eagles, though of this latter I am not certain, as I never saw the birds at the fish. Their cry resembles the nasal quack of a Wood Duck (*Chenonetta jubata*). I never saw them away from the waterholes."

In the *Emu*, Vol. VII., p. 172, 1908, from Mackay, N. Queensland, E. M. Cornwall observed: "The sea between the mainland and the Great Barrier Reef is plentifully dotted with rocks and islets of varying sizes, and on nearly every one of these a pair of Sea Eagles (*Haliaëtus leucogaster*) have made their home. A tree is chosen as a nesting-site, if available, but when the islands are barren a rocky peak or bluff is selected, and the nest becomes huge as the rebuilding goes on year after year. The White-bellied Sea-Eagle is an early breeder. On 7th April a very old nest on Round Top Island was being rebuilt, and on 26th May two eggs were laid. These were robbed by some vandal, but the birds laid again in the old nest, and on 3rd August a pair of lusty fledgelings occupied the nest. Plenty of food in the shape of fish and sea-snakes lay about the nest, much of it being particularly 'high,' in more senses than one. These birds destroy great numbers of sea-snakes: hundreds of their skeletons picked bare by the birds may be seen on any of the islands. Once only have I had the pleasure of seeing a snake being carried off by his enemy, the Eagle. It occurred at Slade Rock, a small islet lying a few miles to the north of this port. The sudden appearance of our party round a jutting rock startled the bird, and he dropped his prey at our feet. It proved to be a monster about 6 feet long, and weighing six or seven pounds. On May 29th one fresh egg was noted in a nest on Cullen Island, and on the same day a nest on Victor Island was found ready for eggs. On 16th June two eggs were found in a nest on Irvine Island. During the last week of July pairs of Sea-Eagles were noticed on many of the islands of the Percus Group, but the nesting-season was evidently over, many immature birds being in evidence."

Mr. J. D. Maclaine, in the same volume of the *Emu* (p. 191), from the opposite end of Australia, gave the following note: "Clarke Island (Bass Strait), 15th September, 1907. Have noticed very few of the White-bellied Sea-Eagles (*Haliaëtus leucogaster*) this season: it is indeed a *rara avis.* Many places here where they formerly nested are now deserted, owing probably to their having died from the effects of the poison laid for them upon the sheep-stations of the north-east coast of Tasmania, about 18 miles away. I am told that they kill a great number of lambs, and consequently get poisoned for so doing, but personally I very much doubt their lamb-killing propensities, as I have never known them to interfere with our flock, and when examining the nests with fledgelings have noted that the bones in and about the nest are either fish or snake bones. I think they must confound them with the Wedge-tailed Eagle (*Uroaëtus audax*). We never shoot or destroy the Sea-Eagles—not only for the above reasons, but also on account of their rarity—anyhow in these parts."

The notes given by Messrs. Campbell and White regarding the birds of the Capricorn Islands (*Emu*, Vol. X., p. 195, 1910) do not exactly agree with the above note by Captain White, so are here reproduced: "Each island visited seemed to be the abode of a pair of Sea-Eagles. Eyries, with young, were observed and photographed on Mast-Head and Erskine Islands. In the former the nest was in a large Pisonia tree, which was about 60 feet high. The Eagles, when hovering over an island, particularly in the mornings, made Goose-like cackling notes. They did not seem to prey on the birds of the locality, but on sea-snakes and fish. Two nests were discovered on North-west Island, both in Pisonia trees at either end of the island—one of great girth and few limbs. The nest was a huge collection of boughs and sticks, and contained fully-fledged young which in colour much resemble the Wedge-tailed Eagle and could easily be mistaken for that bird. The other nest also contained young. The old birds were very quiet and sat by the nest, and allowed one to approach the base of the tree before taking flight. At dusk every evening these fine birds visited the part of the island on which the camp was situated, and would swoop down amongst the Pisonias, from which the Noddy Terns would fly out in clouds; it was always too dark to make sure if the Eagles were in pursuit of the Terns, but we supposed this was the case, otherwise why should they come there at that time—*i.e.*, when the Terns had congregated from the surrounding sea."

Macgillivray, writing of N. Queensland birds (*Emu*, Vol. XIII., p. 150, 1914), records: "Mr. M'Lennan first met with this species at Sedan, on the Cloncury River, early in March, and afterwards at Byromine. When camped on the Leichhardt River he made the following note: 'Heard a strange bird calling as soon as I woke, so I got the gun and proceeded to investigate, but did not succeed in locating the bird. Returned to camp, had breakfast, and then went down the river. After a while I left the water's edge and started back through the timber, and about 100 yards from the edge of the water I heard the same call, and followed up the sound. I soon located the bird, a White-bellied Sea-Eagle sitting beside its nest in a large river gum. It flew off as I approached, and the male flew from a tree near by. Later in the day I climbed to the nest: it contained one hard-set egg. The nest was very large, and had evidently been used and added to for several years, measuring 6 feet in depth by 8 feet in diameter; egg cavity, 2 feet across by 6 inches deep. The nest was composed of sticks and lined with green leaves, and placed in a fork at about 50 feet from the ground.' Another nest, found on the Macarthur Islands on the 2nd July, 1911, was in a mangrove at a height of 14 feet. This nest measured 9 feet by 6 feet in width, 6 feet deep, with an egg chamber 1 foot across by 9 inches deep. Other nests mostly containing young were found on Cairncross, Bushy, and the Bird Islands early in July. There were also several nesting-places on the mainland at Cape York."

Gould's observations are worthy of notice: "It has neither the boldness nor the courage of the Wedge-tailed Eagle, whose quarry is frequently the Kangaroo and the Bustard; and, although at first sight its appearance would warrant the supposition that it pursues the same means for obtaining living prey as the true *Pandion*, by the act of submersion, yet I can affirm that this is not the case, and that it never plunges beneath the surface of the water, but depends almost entirely for its subsistence upon the dead Cetacea, fish, etc., that may be thrown up by the sea and left on the shore by the receding waves, to which, in all probability, are added living mollusks and other lower marine animals. Its peculiar province is consequently the seashore, and it especially delights to take up its abode on the borders of small bays and inlets of the sea, and rivers as high as they are influenced by the tide; nevertheless, it is to be met with, though more rarely, on the borders of lakes and inland streams, but never in the forests or sterile plains of the interior. As it is almost invariably seen in pairs, it would appear to be permanently mated, each pair inhabiting a particular bay or inlet, to the exclusion of others of the same species. Unless disturbed or harassed, the White-bellied Sea-Eagle does not shun the abode of man, but becomes fearless and familiar. Among the numerous places in which I observed it in 1839 was the Cove of Sydney, where one or two were daily seen performing their aerial gyrations above the shipping and over the tops of houses; if I mistake not, they were the same pair of birds that found a safe retreat in Elizabeth Bay, skirting the property of Alexander Macleay, Esq., where they might be frequently seen perched on the bare limb of a tree by the water's edge forming an interesting and ornamental addition to the scene. In Tasmania it is especially abundant in D'Entrecasteaux Channel, and along the banks of the Derwent and the Tamar; and there was scarcely one of the little islets in Bass's Straits but was inhabited by a pair of these birds, which, in these cases, subsisted in a great measure on the Petrels and Penguins which resort there in great numbers to breed and which are very easily captured. . . . On a small island, of about forty acres in extent, opposite the settlement of Flinders, I shot a fully-fledged young bird, which was perched upon the cone of a rock; and I then, for the first time, discovered my error in characterizing, in the 'Proceedings of the Zoological Society of London' and in my 'Synopsis,' the bird in this state as a different species, under the name of *Haliaeetus sphenurus*, an error which I take this opportunity to correct. . . . This Sea-Eagle may be frequently seen floating about in the air above its hunting-ground, in circles, with the tips of its motionless wings turned upwards: the great breadth and roundness of the pinions, and the shortness of the neck and tail, giving it no unapt resemblance to a large butterfly. . . . Whether as a result of the progress of civilization and the destructive hand of man this fine bird has been extirpated from the precincts of the great city of Sydney and similarly populous places is for the present race of Australians to say. In all probability, this to a certain extent has been the case: still the bird will hold its own in other parts of the colony for a long time to come; yet (and it is pitiable to contemplate such a contingency) a period will doubtless arrive when the bays and inlets of the southern coast of Australia will no longer be adorned by the presence of this elegant species."

In the *Austr. Mus. Spec. Cat.*, no. 1, Vol. III., p. 215-6, 1911, North quotes part of the above and adds: "As seventy-two years have elapsed since Gould noted this species in the Cove of Sydney, it is interesting to record that the White-bellied Sea-Eagle still occurs in Port Jackson, although it is not nearly so frequently seen as it was ten years ago. On the upper parts of Middle Harbour, an arm of Port Jackson, and about seven miles from Sydney, I have often seen these birds while fishing, and a pair have bred for many years near the head of this inlet. In former years a pair of birds used to breed considerably lower down towards the entrance to Middle Harbour, but the tree they nested in was cut down. . . . On the 31st May, 1901, I saw one of these birds rise from near the surface of the water at Middle Harbour, the five outer primaries standing out separate and distinct like the spread fingers on one's hand, and resembling altogether, with its long wings and short tail, a huge moth. Slowly it started to soar in circles in a gently rising spiral ascent, like ascending an aerial staircase; this it continued for ten minutes, timing it by my watch in hand. Then it reversed the order of its spiral ascent and continued its upward flight: now only a glimpse of silver could be seen as it turned its breast to the sun. At last, when it looked only like a dot in the sky, I saw it joined by its mate, and quickly both were lost to view. Might not this soaring often be done as a means of ascertaining the whereabouts of its consort? It could not be with the object of procuring food. . . . The usual food of this species consists of various mammals, fish, birds, tortoises, eels and the larger crustacea. It will also occasionally capture and carry off any small domestic animal. On Phillip Island, Western Port Bay, Victoria, in my early collecting days, it used to carry off the young kids of Angora goats. One of these birds I dissected contained portions of a large sea mullet, a piece of wiry dead grass, and the remains of undigested portions of fish, scales and fish-bones."

North, in the same place, gives many full notes regarding the nidification and eggs of this bird, and I here quote a few extracts concerning its habits. Mr. George Savidge stated: "Under the nests at Cangai were strewn the empty shells of tortoises: the place smelt of them; they were also upon the platform of sticks that form the bulky nest. My friends at Ulmarra have seen this Eagle catch and carry away shot ducks, and upon one occasion it had a great struggle with a full-grown goose that was on the water, but did not succeed in killing it." Mr. W. C. Plummer said that he recollected one of these Eagles carrying off a sucking-pig, but from contemporary accounts of this bird's strength such a feat seems doubtful. Mr. George Masters gave this note to North: "When collecting at Port Lincoln, South Australia, in November, 1865, with a companion, he visited Louth Island, lying about five miles off the coast. On arriving there he observed a pair of *Haliæetus leucogaster* circling overhead, but out of range: the island was covered with a short undergrowth, and in parts the abode of countless numbers of Little Penguins (*Eudyptula minor*). Later on he discovered the nest built on a cliff, about one hundred feet above, and overhanging the water, containing two half-fledged young. The nest was an immense structure, built of boughs and thin sticks lined with finer material, twelve feet in diameter, the top of it two feet in height from the ground and had evidently been resorted to for a number of years. In and around it were over two hundred more or less perfect skins of Little Penguins, which had been entirely divested of every particle of flesh by the Sea-Eagles leaving the skins almost entire." Mr. E. D. Atkinson wrote: "Some years ago, when living in D'Entrecasteaux Channel, Tasmania, I cut down a tree of medium size on Bruni Island which contained a nest of this species: there were two young birds, one of which was killed by the falling tree, the other I took home and kept for some considerable time. Although it had full liberty it never offered to go far away, but would fly about my house from tree to tree. When I held out a fish it would swoop down and take it from my hand, and then return to its high perch. Unfortunately, and much to my regret, this bird was shot."

Legge, as long ago as 1887, writing of the Birds of Maria Island, Tasmania, took occasion to make the following comments (*Papers and Proc. Roy. Soc. Tasm.* 1887, p. 84, 1888): "Found sparingly round the coast (B(ernacchi)). My son saw one at the settlement. This widely-spread Sea-Eagle is not so common about the indented coast of the south of Tasmania as I should have expected. During the last three years only three examples have been seen by me in the Derwent. It builds occasionally on the Actæon Islands, on one of which Mr. Joseph Graves found a nest in November, three years ago. It was made on the ground among the rank vegetation and low scrub. Gould draws attention to its habit of building on the ground in the islands of Bass Straits, where the structure is formed of the 'twigs and branches of the Barilla bush.' In Ceylon, where it is far more abundant than in these latitudes, and where every inland tank of any size has one or two pairs frequenting it, this eagle always builds on a lofty tree. Gould speaks of the Sea-Eagle being very common in D'Entrecasteaux Channel. I know of one pair building there, but I fancy its numbers have decreased before the efforts of the wild-fowler."

From a criticism of the evidence it would seem that the "wild-fowler" does not deserve much blame in the matter of the extermination of this Eagle, as poison is more correctly blamed by Maclaine, though of course this Eagle cannot be condemned for sheep-killing as a habit. Though this species ranges from India, where it is common through the Islands, and covers the whole of Australia and Tasmania, subspecies have not yet been definitely determined.

When Hartert received specimens from the Northern Territory of Australia he catalogued: "♂♀ ad., ♂♀ juv.," then gave *five* numbers and wrote: "All these specimens are very large. Perhaps there is a larger race of the White-bellied Sea-Eagle in Australia!"

As no measurements are given, nor does Hartert state from what locality the specimens came with which he made comparisons, I cannot give any conclusion.

In the *Nov. Zool.*, Vol. XVIII., p. 248, 1912, I differentiated such birds as being paler than birds from East Australia, but longer series does not advise the present admission of the Western form. These birds seem to vary locally, but, so far, I have been unable to fix subspecies to localities of any extent. There is little difference in size from different localities in Australia, though now and then larger and smaller specimens are measured: moreover, there does not seem to be the usual disparity in sizes between the sexes usually met with in this group.

Nevertheless, a sufficient series of properly sexed adults might enable the fixation of races, and on this account I have not included in the synonymy the multitude of extra-limital references available, but have only given those of importance to Australian students. Though I do not admit the western form as a valid subspecies, I give separately the notes dealing with that, as it is quite at present a problematical race.

Keartland (*Trans. Roy. Soc. S.A.*, Vol. XXII., p. 166, 1898), wrote: "Along the North-west Coast, and on the rivers, these noble birds were seen. They are not at all particular in their diet, as many suppose, but will devour wallabies, ducks, or lizards as readily as they do fish. Mr. T. Carter informed me that he had taken their eggs, near Point Cloates, from a nest in which the remains of several wallabies were found." Mr. Tom Carter has written me: "The North-west aboriginal name for the White-bellied Sea-Eagle is TÀNTAGEE, which means 'butterfly.' The name is very appropriate, for when these noble birds are soaring in circles at a great height, as they frequently do, they very much resemble a giant moth or butterfly. As a rule their bulky nests are placed in situations difficult of access, as on a ledge of cliff placed beneath where the top overhangs, but I have found nests about the Exmouth Gulf and North-west Cape built in stunted white gum-trees, not more than 10 feet from the ground. I found such a nest on June 17, 1902, near Quailing (Exmouth Gulf), which was six feet in diameter and about four in thickness. The bird came from the nest on three occasions in three consecutive days, yet it contained no eggs while I was there. I have several times noted that both this species and *Uroaëtus audax* sit on the nest before any eggs are laid, and cause disappointment upon climbing to it. The usual clutch of eggs is two, which are laid in the Mid-west towards the end of June or early in July. June 21, 1900: took two eggs from a nest built on top of a large milk bush (or caustic bush) growing on a ledge of the vast cliffs of the Yardie Creek between Point Cloates and the North-west Cape. As usual when the eggs are taken, the nest was forsaken for that season and the birds took possession of a deserted nest of the Wedge-tailed Eagle further up the creek. On July 7, 1901, I took two eggs from a nest in the Yardie Creek cliffs: the nest was about 40 feet from the bed of the creek and was overhung by a great ledge so that it could not be approached from the top. On August 12, 1911, two eggs were taken by Mr. Chas. French (who bought Point Cloates Station, 1902) from a nest built on top of an old Osprey's nest on the side of a shady cliff near Maud's Landing. The total structure was a pile of sticks about 7 feet in height in an easily accessible place. I examined it on August 25, 1911, and Mr. French kindly presented me with the eggs. These birds will attack and kill lambing ewes, but not often. On June 23, 1896, I shot one at Point Cloates that had killed many lambs there. On different occasions birds in immature plumage attacked my poultry at Point Cloates, and once I saw one give chase to my tame Straw-necked Ibis there, but the latter easily evaded capture by flying, although the eagle chased it round the house two or three times. The ibis turned and doubled too quickly for the eagle. At Denmark, on the south coast, I saw an immense nest of this bird in a Karu tree growing near the beach of Wilson's Inlet. About the North-west Cape they fed largely on sea-snakes and a species of conger-like eel that lived in the sea-rocks. On one occasion I examined one of the latter (or a sea-snake), about five feet in length and two inches diameter, that I saw one of these eagles drop on the beach."

Mr. C. G. Gibson noted them on the Abrolhos Islands, West Australia, in the *Emu*, Vol. VIII., p. 64, 1908: "White-bellied Sea-Eagle (*Haliaëtus leucogaster*) had almost finished breeding. About eight nests were noted, several with two large young almost able to fly, and others that the young birds had apparently just left. Nests built, as a rule, on the rocky promontories, and close to the water. Noted only on the Wallabis."

Hall's notes in the *Victorian Naturalist*, Vol. XVIII., p. 165, 1902, read: "Sea-Eagles came from their ocean feeding-grounds daily to a nest about two miles inland. It was situated some 150 feet from the ground in a large eucalypt, and to timid people seemed only to be got at by the wind. It was a wonderful pile of faggots. On the Abrolhos Islands I found I could get two nests without the necessity of trying my nerves. One I stepped into from the ground and turned the fledged young one out for a time, so that I might sit in it to try its comfort. To the other I simply had to walk up a few rocks that once formed part of a cliff. Judging by the manner which a pair continued to sail round the nest, and the new material of the upper portion of it, I should say they were about to lay their eggs, as the time of laying varies very much. The nest was not more than 15 feet above high water mark and placed between old masses of rock left when all softer material had been washed away."

Hill (*Emu*, Vol. X., p. 266, 1911) observed: "An uncommon bird on the Kimberley coast-line (North-west Australia). The blacks told me that they often saw these Eagles carry away turtles, which they caught by swooping down upon them as they rose to the surface to breathe. In a subsequent trip to Bernier Island, off Carnarvon, West Australia, I noticed that these birds lived almost entirely on sea-snakes."

GENUS—HALIASTUR.

HALIASTUR Selby, Cat. Gen. Subgen., Types Aves, p. 2 (note), 1840 .. .. Type *H. indus.*

Dentiger Hodgson, in Gray's Zool. Miscell., p. 81, 1844 .. Type *H. indus.*

Ictinoaëtus Kaup, Classif. Saugeth. u Vögel, p. 122, 1844 .. Type *H. indus.*

Also spelt—
Ictinaetus Kaup, Archiv. fur Naturg., 1850, p. 39.

Milvaquila Burmeister, Verz. Zool. Mus. Halle, p. 24, 1850 Type *H. indus.*

Halinertus Heine and Reichenow, Nomencl. Mus. Hein., p. 267, 1890 .. .. Type *H. indus.*

MEDIUM Aquiline birds with small sharply-hooked bills, long wings, long tails, short naked legs and small feet.

The bill is small, with the tip long, rapidly descending and much curved, the cere comparatively large; the nostrils oblique ovals, semi-operculate, and not covered by loreal bristles, though these advance over the cere; the upper mandible shows pronounced sinuation on its edges.

The wing is long: the first primary short, less than the seventh, the second about equal to the sixth, the fourth absolutely longest, the third little less and subequal to the fifth.

The tail is long and rounded, scarcely wedge-shaped, and very little more than half the length of the wing.

The legs are short, the tarsus feathered about one-third the length of the front, but not at the back: coarse transverse scales are seen in front, otherwise the tarsus is covered with reticulate scales which however become larger on the back and resemble scutes and also show a tendency to fusion; the tarsus is only about one-fourth the length of the tail.

The toes are short, the middle toe only about two-thirds the length of the short tarsus.

The type of *Haliastur* is *indus*, and this species as a subspecies occurs in North and Western Australia, being obviously a comparatively recent immigrant from the North. Another species, which is also referred to *Haliastur*, agrees structurally fairly well, but is larger, with a comparatively longer tail, with stronger legs and feet and different coloration.

I here propose to distinguish this form subgenerically as

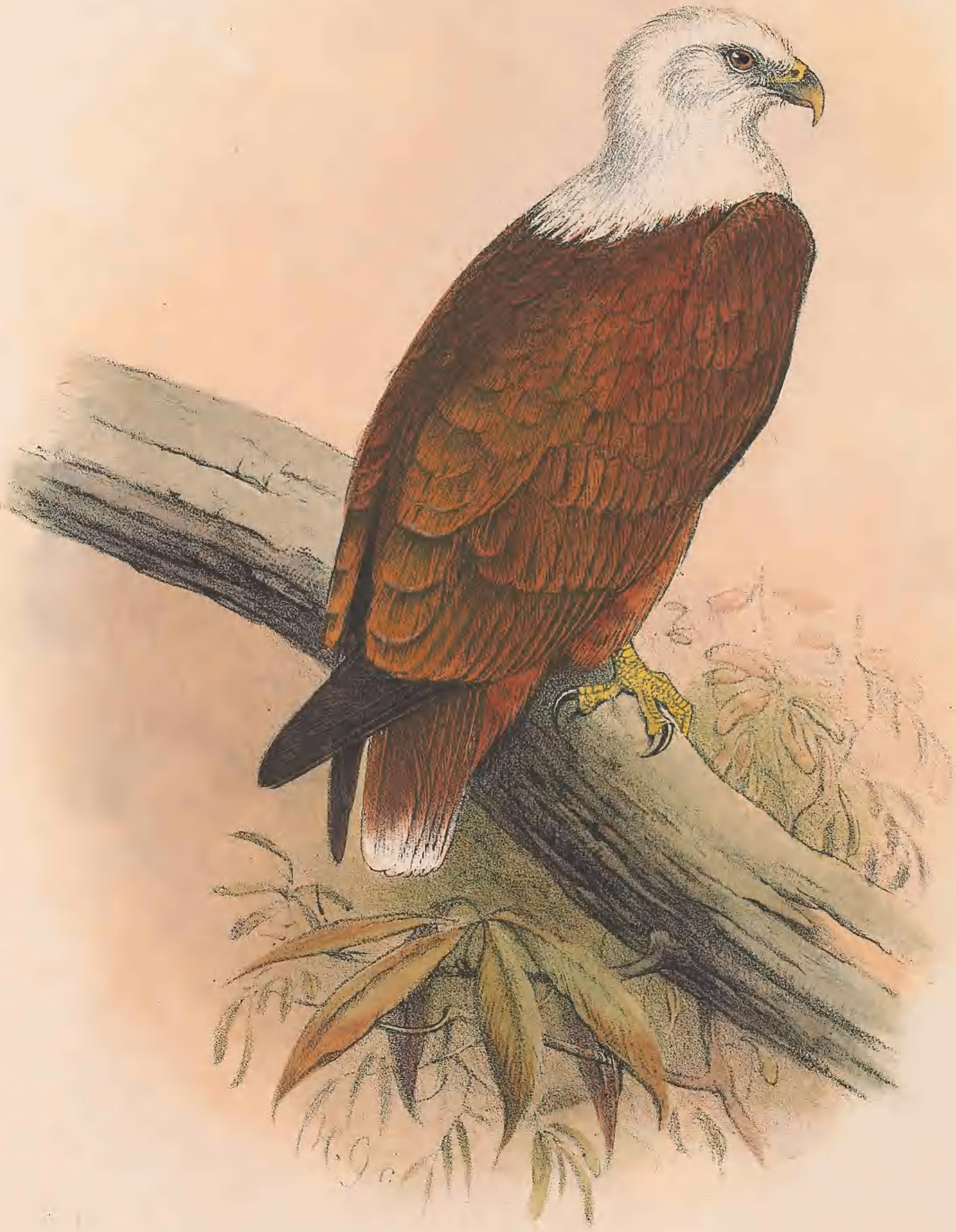
Ictiniastur, subgen. nov.

with type *Milvus sphenurus* Vieillot.

I do this as thereby we have a name to indicate a most interesting episode in bird evolution and zoogeography. It seems possible to trace the history of these two birds thus: *Ictiniastur* in its adult plumage shows the immature phase of *Haliastur*, and we may deduce that it arrived in Australia from the north when the birds used that plumage; when this occurred it ranged over Australia and even penetrated into the interior, but before it arrived in the South, Tasmania was separated, as it does not occur in that Island. It altered its habits and became accustomed to land life in every way and also retained its immature plumage, but developed a little in size. Its ancestor stayed in India, kept to the seashore and developed a beautiful new adult plumage: then, while bearing the new plumage, it commenced a southward travel, and working through the Malay States and the Islands arrived in Australia and penetrated down to New South Wales on the east and ranged down to West Australia on the west. It also ranged north to the Philippine Islands. In each case after it left India it continued its colour-change, arriving at its purest stage in Australia and now approaching it at the Philippines. In the meanwhile the success of *Ictiniastur* in adapting itself to new conditions led it to range northwards again, and it has reached New Guinea and New Caledonia.

This story may be written in another way, but still the theory is worthy of consideration, and names should be used for the easy transmission of such theory.

It is worthy of note that these two birds seem to indicate two distinct migrations into Australia from the north, both of which took place after the breaking of the Bassian Isthmus: by after, is intended to convey the fact that the Bassian Isthmus was severed before the first immigration had reached that far. The second immigration, as shown by *Haliastur*, is the one which is most evident from a superficial study of the Australian Avifauna. A certain companion of *Haliastur* would seem to be *Baza*, while the majority of the other Australian Falconiformes would seem to belong to the *Ictiniastur* migration.



H. Grönvold. del.

Witherby & Co.

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HALIASTUR LEUCOSTERNUS.

(WHITE-HEADED SEA-EAGLE).

No. 301.

HALIASTUR INDUS.

WHITE-HEADED SEA-EAGLE.

(RED-BACKED SEA-EAGLE.)

(PLATE 244.)*

FALCO INDUS Boddaert, Tabl. Planch. Enlum., p. 25, 1783; Pondichery, India.

Haliaeetus leucosternus Gould, Synops. Birds Austr., pt. III., pl. (40), 1838; New South Wales = Moreton Bay, Queensland.

Falco ponticerianus Shaw and Nodder, Nat. Miscell., Vol. X., pl. 389, 1799 (partim).

Pondicherry E(agle), Latham, Gen. Synops. Birds, Suppl. II., p. 32, 1801 (part).

White-headed Rufous Eagle, Latham, Gen. Hist. Birds, Vol. I., p. 218, 1821.

Haliaetus girrenera Vieillot and Oudart, Gal. d'Ois, Vol. I., pt. II., pl. X., p. 31, 1821 (part only if at all).

Haliaeetus leucosternus Gould, Synops. Birds Austr., pt. III., pl. (40), 1838 (Apl.); *id.*, Proc. Zool. Soc. (Lond.) 1837, p. 138, 1838 (Dec.); Witmer Stone, Austral Av. Rec., Vol. I., p. 145, 1913.

Haliastur leucosternus Selby, Cat. Gen. Subgen., Types Aves, p. 2 (note), 1840; Gould, Birds Austr., Vol. I., pl. 4, 1848; *id.*, Handb. Birds Austr., Vol. I., p. 17, 1865; Ramsay, Ibis 1865, p. 83 (Q.); *id.*, Proc. Zool. Soc. (Lond.) 1867, p. 393; Diggles, Orn. Austr., pt. 17, pl. 3, 1868 (Q.); Masters, Proc. Linn. Soc. N.S.W., Vol. I., p. 45, 1876; Ramsay, Proc. Zool. Soc. (Lond.) 1875, p. 578; Mathews, Nov. Zool., Vol. XVIII., p. 10, 1911 (Q.); Macgillivray, Emu, Vol. XIII., p. 151, 1914 (Q.); Barnard, *ib.*, Vol. XIV., p. 41 (N.T.).

Haliastur leucosternum Blyth, Ibis 1865, p. 28.

Haliastur girrenera Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 315, 1874 (Q.); Ramsay, Cat. Austr. Accip., p. 33, 1876; Broadbent, Proc. Roy. Soc. Queensland, Vol. V., p. 14, 1888; North, Austr. Mus. Cat., no. 4, p. 34, 1898; Hall, Key Birds Austr., p. 1, 1899; Carter, Emu, Vol. III., p. 33, 1903 (N.W.A.); Banfield, *ib.*, Vol. VI., p. 16, 1906 (Q.); Ashby, *ib.*, p. 73 (N.T.); Hall, *ib.*, Vol. VII., p. 26, 1907 (N.W.A.); Cornwall, *ib.*, 172, 1908 (Q.); Mathews, Handl. Birds Austral., p. 41, 1908; Whitlock, Emu, Vol. VIII., p. 177, 1909 (W.A.); Hill, *ib.*, Vol. X., p. 266, 1911 (N.W.A.); North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 223, 1911.

Haliastur indus subsp. *girrenera* Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 177, 1878; Gurney, Ibis 1878, p. 460; *id.*, List Diurn. Birds Prey, p. 79, 1884; North, Austr.

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* The Plate is lettered *Haliastur leucosternus.*

Mus. Cat., no. 12, p. 8, 1890 ; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 19, 1901 ; Le Souëf, Emu, Vol. II., p. 140, 1903 (N.T.).

Haliastur indus girrenera Hartert, Nov. Zool., Vol. XII., p. 208, 1905 (N.W.A.).

Haliastur indus leucosternus Mathews, Nov. Zool., Vol. XVIII., p. 249, 1912 ; *id.*, List Birds Austr., p. 107, 1913.

Haliastur indus subleucosternus Mathews, Nov. Zool., Vol. XVIII., p. 249, 1912 ; Derby, North-west Australia.

Haliaetus australis " Gray MS." Mathews, *ib.*, *nomen nudum.*

DISTRIBUTION. New South Wales ; Queensland ; Northern Territory ; West Australia.

Adult male. Back, wings, and tail chestnut, like the abdomen, under tail-coverts, thighs, flanks, axillaries and under wing-coverts, with conspicuous dark shaft-lines to the feathers, somewhat widened on some of the feathers of the bastard-wing and primary-coverts ; primary-quills black for more than the apical half, the black decreasing in extent on the inner ones, paler and more cinnamon on the inner webs of the primary- and secondary-quills ; third to the sixth primary-quills incised on the outer webs ; tail-feathers more or less tipped with white ; head, hind-neck, mantle, throat, fore-neck, and breast white ; quill lining cinnamon at the base, blackish for the remainder. Iris clear brown ; bill bluish horn, tip yellowish-white ; cere yellow ; feet yellowish. Total length 450 mm. ; culmen 25, wing 369, tail 185, tarsus 46. Figured. Collected at Cairns, North Queensland, on the 23rd of June, 1884.

Adult female. Similar to the adult male but slightly larger. Wing 374 mm., culmen 28, tarsus 58. Collected on Augustus Island, North-west Australia.

Nestling. Covered with whitish down, with a buff stripe down the centre of the head and round the back of the neck ; back brown.

Immature. Above brown, with the edges of the feathers whitish ; primaries black, inner webs white at the base ; tail brown, tip and inner webs at the base whitish ; under wing-coverts chestnut with black centres to the feathers : under tail-coverts, thighs and flanks white, which in the adult are chestnut ; throat whitish ; head light buff with dark brown bases and edges ; hind-neck, mantle, fore-neck and breast (which in the adult are white), chestnut-brown with light centres to the feathers, the feathers of the mantle being darker.

Nest. The usual structure, composed of twigs and lined with fine bark or leaves about two feet across.

Eggs. Clutch two ; bluish-white, no gloss, sparingly marked, but more at the larger end with spots and lines of every shape. Axis 55-58 mm. ; diameter 40-44.

Breeding-season. May to September.

THE first note of this bird by Latham appears in the Second Supplement to the *General Synopsis of Birds*, p. 32, 1801, where, under the title "Pondicherry E(agle)," he wrote: "A bird seemingly of this last kind is found in New Holland, in which the head, neck and belly are pure white, without any streaks: the rest of the body a dull rust-colour. It is called *Girrenera* ; part of its food consists of eggs, as the stomach of one was found full of *eggshells.*"

This description was taken from the Watling Drawings, where two paintings are given. On one Watling had written: "The stomach of the bird when taken was full of egg-shells," and on this plate Latham wrote: "Pondicherry Eagle. . . . Probably this should be made a distinct species." On the other, Watling noted: "The natives call this bird *Girrenerà.* This hawk lives a good deal on fish, which most of that genus do that inhabit New South Wales, where there are several varieties; the likeness of this kind is strongly imitated."

This is of more than usual interest, as it seems certain from the preceding that the Watling specimen was taken in New South Wales, where it is one of the rarest birds and was, even in Gould's time, as here reproduced. Gould wrote: "In size and in the general markings of its plumage this beautiful species is closely allied to the *Haliastur intermedius* of Java and the *H. indus* of India, but the total absence of the coloured stripe down the centre of the white feathers which clothe the head, neck, and breast of the Australian bird at once distinguishes it from its Indian and Javan allies. A more beautiful instance of analogy than that which these three birds offer to our notice can scarcely be imagined, and I feel assured that in their habits they are equally similar. The White-breasted Sea-Eagle is very common on the northern and eastern portions of Australia, where it takes up its abode in the most secluded and retired parts of bays and inlets of the sea. Upon one occasion only did I meet with it within the colony of New South Wales, but I have several times received specimens from Moreton Bay; the individual alluded to above was observed soaring over the brushes of the Lower Hunter. The chief food of this species is fish and crustaceans, which it captures either by plunging down or by dexterously throwing out its foot while flying close to the water, such fish as swim near the surface being, of course, the only ones that become a prey to it; sometimes the captured fish is borne off to the bird's favourite perch, which is generally a branch overhanging the water, while at others, particularly if the bird be disturbed, it is borne aloft in circles over the head of the intruder and devoured while the bird is on the wing, with apparent ease. Its flight is slow and heavy near the ground, but at a considerable elevation it is easy and buoyant."

North, in the *Austr. Mus. Spec. Cat.*, no. 1, Vol. III., p. 224, 1911, states: "In New South Wales I observed it at the entrance of the Tweed River Heads. Dr. E. P. Ramsay procured specimens at the Richmond River, Mr. G. Savidge noted it at the Clarence River Heads, Mr. R. Grant met with it at the Bellinger River Heads, and Lewin shot one in 1801 on the Lower Hunter River, where Gould also observed a single example many years later: this is the furthest south I have known this species to occur."

As I will show later, though Latham did not in 1801 distinguish the Australian bird with a Latin name, though questioning its identity, in 1821 he differentiated it under the name White-headed Rufous Eagle. As in that work he gave no Latin equivalents, it was left for Gould in 1838 to name the Australian form ; it is now obvious that though the type specimen is labelled New South Wales, the type-locality is now Queensland, viz., Moreton Bay.

The most vivid, realistic and interesting account of this species is that given by Banfield in his valuable study entitled, "Confessions of a Beachcomber." This account appeared in the *Emu*, Vol. VI., p. 16, 1906, and was copied in the *Austr. Mus. Spec. Cat.*, no. 1, Vol. III., p. 224, 1911, but is still worthy of reproduction in its entirety here.

"All the forest brood do not plot mutual slaughter. Some live in strict amity. Here, on this Moreton Bay Ash, taken advantage of (as a nesting tree) by the Shining Calornis, a White-headed Rufous-backed Sea-Eagle nests, and the graceful fierce-looking pair come and go among the glittering noisy throng without exciting any special comment. Now the White-headed Sea-Eagle, with its sharp incurved beak, terrible talons, and armour-plated legs, is a friend to all the little birds. They know and respect and almost venerate him. A horde of them never seeks to scare him away with angry scolding and fierce assault, as it does the cruel Falcon and the daring Goshawk. Domestic fowls learn of his ways, and are wise in their fearlessness of him. But I was not well assured of the reason for the trustfulness and admiration of the smaller birds for the fierce-looking fellow (the Rufous-backed one), who spends most of his time fishing, until direct and conclusive evidence was forthcoming. Two days of rough weather, and the blue bay had become discoloured with mud churned up by the sea, and the Eagle found fishing poor and unremunerative sport. Even his keen eyesight could not distinguish in the mucky water the coming and going of the fish. Just near the house is a small area of partly-cleared flat, and there we saw the brave fellow roaming and swooping about with more than usual interest in the affairs of dry land. At this time of the year green snakes are fairly plentiful. Harmless and handsome, they prey upon small birds and frogs, and the Eagle had abandoned his patrol of the sad-hued water to take toll of the snakes. After a graceful swoop down to the tips of a low-growing bush, he alighted on the dead branch of a Bloodwood, one hundred and fifty yards or so away, and, with the help of a telescope, his occupation was revealed: he was greedily tearing to pieces a wriggling snake, gulping it in three-quarter yard lengths. Here was the reason for the trustfulness and respect of the little birds. The Eagle was destroying the chief bugbear of their existence, the sneaking greeny-yellowy murderer of their kind and eater of their eggs, whose colour and form so harmonise with leaves and thin branches, that he constantly evades the sharpest-eyed of them all, and squeezes out their lives and swallows them whole. But the big red detective could see the vile thing fifty and even one hundred yards away, and once seen—well, one enemy the less. In five minutes a slight jerk of the neck indicated a successful observation, and he soared out, wheeled like a flash, and half turning on his side, hurtled down in the foliage of a tall Wattle, and back again to his perch. Another snake was crumpled up in his talons, and he devoured it in writhing twisting pieces. Within ten minutes the performance was repeated for the third time, and then either the supply of snakes ran out or the bird was satisfied. The White-headed (? Rufous-backed) Sea-Eagle is a deadly foe to the pugnacious Sea-serpent also. On the beach just above high water mark was the headless carcass of one that must have been fully five feet long, and while it was under inspection an Eagle circled about anxiously. Soon after the intruders disappeared the bird swooped down and resumed his feasting, and presently his mate came sailing along to join him. The snake must have weighed several pounds, and apparently was not so dainty to the taste as the green arboreal variety, for after two days' occasional feasting there was still some of the flesh left. Unbecoming as it may be to tantalise by trickery so regal a bird, a series of trials was undertaken to ascertain the height from the surface whence a fish could be gripped. Twelve successive swoops for a mullet flopping on the sand failed, though it was touched at least six times with the tips of the Eagle's outstretched talons. Consummatory to failure, the bird was compelled to alight undignifiedly a few yards away, to awkwardly jump to the fish, and to eat it on the spot: for however imperious the Sea-Eagle is in the air and dexterous in the seizure of a fish from the water, he cannot rise from an unimpressionable plane with his talons full. On another occasion a fish was raised four inches on a slender stake. The Sea-Eagle dislodged it several times, but could not grasp it. Raised a further four inches the fish was seized with fumbling. Eight inches or so, therefore, seems to be the minimum height from which a bird with six feet of red wing, and a nice determination not to bruise or soil the tips, may grasp with certainty."

Ramsay, when describing the eggs in the *Ibis*, 1865, p. 83, noted: "In almost every instance the nests found by Mr. J. Rainbird were placed near the tops of the larger trees, in belts of Mangroves skirting the edges of salt water swamps and marshes in the neighbourhood of Port Denison. They were composed of twigs and dead branches of Mangroves, lined with a finer material. One from which that gentleman shot the bird, and brought me the eggs upon which she was sitting, was lined with tufts of lichen, and in this instance the eggs were placed on various fishbones, shells and claws of crabs, etc.; the edges and sides were beautifully ornamented with long streamers of bleached seaweed, which gave the nest a novel and pleasing appearance."

In the *Proc. Zool. Soc.* (Lond.) 1875, p. 578, Ramsay added: "Very common all along the coast (of Queensland); they venture as far south as the Clarence river, where they are considered rare, and extend northwards to Cape York and coast of New Guinea."

North, in the *Austr. Mus. Spec. Cat.*, no. 1, Vol. III., p. 225, 1911, gives the following note by Mr. Robert Grant: "During our second trip to North-eastern Queensland, Mr. E. J. Cairn and myself were compelled through monsoonal rains to camp near Cairns. We had, therefore, an opportunity of seeing and shooting many Rufous-backed Fish-Eagles (*Haliastur girrenera*), as they were very numerous in the Mangroves about the mud-flats around the bay. As the tide went out nearly half a mile, and left exposed many hundreds of dead or dying fish on these evil-smelling and sweltering mud-flats, it was a perfect paradise for these Fish-Eagles; however, as the feathers were much abraded, and their plumage soiled, of the many we shot there was not one worth keeping to prepare as a specimen."

In the same place appear Mr. G. Savidge's notes as follow: "I have not had much opportunity of observing the habits of *Haliastur girrenera*, but there is one pair always about Yamba Bay, Clarence River Heads. I have seen them after the fishermen have hauled their nets come to the place and pick up and carry away the small fish sometimes left there. One pair came regularly nearly every morning and perched on a high piece of jutting rock quite close to our house: the rock formed part of the retaining wall there. The fisherman whom I mentioned the fact to told me these birds often take away any fish left about, and even take the fish from the nets, which are left for a few hours, the fishermen often coming home before daylight, and their nets bundled ashore, to be hung up later on. I was shown fish with their claw marks quite plain on them. No person at Yamba, as far as I could ascertain, knows their breeding-place, but they seem very tame, and the fisherman said they were quite a nuisance to him. During one of our dry seasons, in 1902 I think, a pair resided about Copmanhurst Wharf for several months during the winter time; they were living principally upon the garfish which came up that year in very large shoals. This pair of birds remained so long I was in hopes they would breed, but as spring came they disappeared. Their backs are a beautiful chestnut-red when they wheel about, and the sun shines upon them."

Cornwall (*Emu*, Vol. VII., p. 172, 1908) from Mackay, North Queensland, wrote: "The White-headed Sea-Eagle (*Haliastur girrenera*) frequents the mouths of the rivers and creeks along the coast, rarely going far inland, and seldom being noticed on the islands out at sea. The immense belts of mangroves afford plenty of shelter, and in their recesses their nests are generally placed. They return season after season to the same locality to nest, sometimes renovating the old nest, at other times building a new nest in an adjacent tree. They start nesting in June and July. A nest found on 28th August contained one young bird and one egg, the latter being chipped; on 16th October they were fine chicks, able to fly a short distance, and a week later they had left the nest for good."

Probably as much has been written on the status of this bird as any Australian form.

The first questioning of its specific status seems to have been due to Gurney, who however did not publish his views, but personally communicated them to Gould and Blyth. The latter (*Ibis,* 1865, p. 27), dealing with Horsfield's types from Java, recorded the following:

"*Falco pondicerianus apud* Horsfield is a race intermediate to *Haliastur indus* of India proper and *H. leucosternum* of Australia, having dark central streaks to the white portion of the plumage, but considerably less developed than (constantly) in the Indian bird. An Indian specimen and a Javanese one may, at the present time, be seen together in the Zoological Gardens, Regent's Park. Of very many examples of the Indian race examined or beheld close, I certainly have never seen one that has the dark streaks or lines so little developed as in the Javanese bird, or most assuredly I should have remarked it. To what extent the Indian and Australian races may thus grade into each other, in other intermediate localities, remains to be ascertained. Examples from Siam are similar to those from Java; while specimens from Bourou, Gilolo and Aru are of the true Australian race, without a trace of the medial stripes on the white feathers of the plumage. Mr. Gurney informs me that he thinks the Javanese race should be distinguished by the name *intermedius.* The Australian is figured by Vieillot as *Haliaëtus girrenera* (*Gal. d'Ois.*, t. 10), but he did not discriminate it apart from the Indian."

Sharpe, in the *Cat. Birds Brit. Mus.*, Vol. I., 1874, admitted, p. 313, *Haliastur indus*; p. 314, Subsp. (α) *Haliastur intermedius*; and p. 315, Subsp. (β) *Haliastur girrenera.* The last name was utilised in spite of Blyth's definite statement that it was not available, and, though Gould's name *leucosternus* was absolutely correct, Australian writers, unable to investigate such matters for themselves on account of the lack of literature, were compelled to accept Sharpe's decision. Writers better placed did not interest themselves, as any name, right or wrong, was to them good enough for an Australian bird.

Gurney, in the *Ibis* 1878, p. 460, gave a lot of time to this species, but of course was entirely dependent for his names upon Sharpe. His remarks read: "The position of the genus *Haliastur,* to which I propose next to refer, was well described by the late Dr. Jerdon in the following remarks on the species inhabiting India. . . . 'It may be considered either an aberrant form of *Haliætus* leading to the Kites, or an aberrant Kite leading to the Sea-Eagles; and its small size and near affinities to *Milvus* have decided me to class it with the Kites.' The genus *Haliastur* comprises two species, *H. indus* and *H. sphenurus*; but the first of these, which ranges from Cashmere and China northwards to as far southwards as Australia, comprises three geographical races or sub-species—the northern and north-western: the typical *H. indus,* in which the white portions of the plumage in the adult bird, *i.e.* the head, neck, breast and interscapular region, have conspicuous dark shaft marks on the feathers: the south-eastern, *H. girrenera,* in which these shaft marks are most frequently entirely absent: and the race inhabiting various intervening localities, in which they are present but are narrower, fainter and frequently fewer than in *H. indus.* The birds of this form have received the specific appellation of *H. intermedius,* but vary much in different islands where they are found, some approaching nearer to *H. indus* and others to *H. girrenera,* these variations for the most part corresponding with the geographical position of the localities which the birds inhabit."

Six pages of details of the variation then follow which cannot be here reproduced.

Twenty years afterward the matter was again fully discussed by Meyer and Wiglesworth in the *Birds of Celebes,* and I here give extracts. On p. 51, under the name *Haliastur indus,* they noted: "This species ranges in great abundance from the Indian countries and Ceylon throughout the East India Archipelago as far as New Guinea and the Solomon Islands to Australia. As it extends its range from India eastwards and southwards it diminishes in size, and the dark shaft-streaks on the white plumage of the head, neck and breast gradually diminish in breadth, until in New Guinea and the neighbouring islands they quite disappear. In India and Burmah the stripes are broad and take in some of the web of the feather on either side of the shaft: in Ceylon, Siam, Malacca and Sumatra the stripes are generally narrower; a further decrease is seen in specimens from Java, Sumbawa, Sumba, Flores, Borneo and the Philippines, where the streaks appear to be confined to the shafts which are very distinct and black, and Javan specimens were named *intermedius* by the late J. H. Gurney. A little more east, a still further decrease in the dark shaft-streaks is to be seen in specimens from

Sangi, Celebes, Sula, Halmahera, Obi Major, Amboina, Buru, Timor and North Australia, where the dark shaft-lines are, as a rule, thin and scanty, or are quite absent, leaving the head, neck and breast pure white; in New Guinea and the surrounding islands, New Ireland, Solomon Islands and Aru, these parts are apparently, in general, pure white, and this most eastern form of the species has received the name *girrenera* from Vieillot. But the species is so plentiful throughout its range, and the transition from the broad striped specimens of India to the white ones of New Guinea is so gradual and regular, that it is impossible to draw any distinct lines of demarcation between specimens from neighbouring localities; and any geographical sections of the whole which have been called by distinct names are, by definition, only subspecies, or even subsubspecies. . . .

"*Haliastur indus* arouses another question in nomenclature. If subspecies be distinguished by a trinomial, under what form of nomenclature are the forms which interconnect them to be spoken of? In the present case, if the two extreme races only of *H. indus* are treated of as subspecies, the main body of the species is made up of intermediate forms. Specimens from Java, which stands in character about midway between those of India and New Guinea, have been named *intermedius* by Gurney: and those of Celebes, which are again intermediate between the latter and those of New Guinea, were named *H. indus var. ambiguus* by the late Dr. Brüggemann; but the last named, like those intermediate between *intermedius* and the typical *indus*, cannot be regarded as more than subsubspecies: and if such a subdivision ever came into use four names must be employed for it. In such a case it is certainly much easier to remember the facts than the names which are intended to call them to mind, and the nomenclature employed would defeat its own purpose. Therefore we prefer to give no long names, but to designate the forms intermediate between the typical *H. indus* and *H. indus—girrenera* (the — is an error here) in the following manner: *Haliastur indus—girrènera*, with the remark that a long hyphen connecting the names of two subspecies serves to designate the intermediate forms which connect them. It does not appear to be advisable to recognise *H. indus intermedius* as a third subspecies, since this is not aberrant but distinctly intermediate between the two extremes of variation in *H. indus*. . . . Better suited to the ornithological needs of the present day . . . are the signs > and < . . . We use them as follows:

"*Haliastur indus* > *girrenera* means that the specimen so indicated is more like the typical *indus* than *girrenera* (viz., ordinary birds from Ceylon, Sumatra, etc.)

"*Haliastur indus* < *girrenera*, more like *girrenera* than *indus* (Celebes, etc.).

"*Haliastur indus* = *girrenera* sharing equally the characters of *indus* and *girrenera*, intermediate (Java, etc.)."

I have quoted this, as the problem above discussed is one that will trouble Australian ornithologists in the future when deeper interest is taken and longer series are brought together from many localities. Thus, long series of the present species would solve some of the troubles displayed by Meyer and Wiglesworth, but probably induce others.

My own examination suggests the recognition of at least four subspecies, with the difficulty of attaching many specimens from intervening localities, thus:

Haliastur indus indus Boddaert.
India; Burmah.
Haliastur i. indus—intermedius.
Ceylon, Siam, Sumatra, Malacca.
Haliastur indus intermedius Blyth.
Java; Sumbawa; Sumba.
Haliastur i. intermedius—ambiguus.
Borneo.
Haliastur indus ambiguus Brüggemann.
Celebes; Philippines.
Haliastur i. ambiguus—leucosternus.
Aru; New Guinea; Solomon Islands.
Haliastur indus leucosternus Gould.
Australia.

The one fact I have is that no striped birds occur in Australia, whereas they do in Celebes, etc., Meyer and Wiglesworth observing: "In Halmahera, Amboina, Celebes, etc., pure white plumage on the head, neck, and breast is common."

I differentiated the West Australian bird under the name *Haliastur indus subleucosternus*, but do not here recognise it, though later this may have to be done. The notes concerning this form are therefore kept separate and follow hereafter. The reasons for the usage of Gould's name must be again explained in full owing to the unexpected action of Messrs. Rothschild and Hartert. Although Blyth wrote the truth, Sharpe utilised the name *girrenera* for the white-headed phase, and this was followed by the majority of writers until I rejected it in the *Nov. Zool.*, Vol. XVIII., p. 10, 1911, explaining: "Vieillot (*Galerie d'Ois.*, Vol. I., pl. x., 1820) proposed *Haliæetus girrenera* simply as a new name for the bird described as *Falco pondicerianus* Gmelin." He wrote: "On le trouve aussi, selon Latham, à la Nouvelle Hollande, où il porte le nom que nous lui avons conservè." Of course this cannot be construed as separating the Australian from the Indian bird, especially when the context is read. Consequently we must revert to Gould's name founded on the Australian species.

The facts are so self-evident that I never for a moment anticipated any argument upon such a simple matter, yet Rothschild and Hartert, in the *Nov. Zool.*, Vol. XXI., p. 210, June 15, 1914, use *Haliastur indus girrenera*, writing: "Mr. Mathews rejected the name *girrenera* as not being applicable to the Australian form, but we cannot agree to his ruling. . . . As the habitat are given India and Australia. . . . We are, therefore, of opinion that the name *girrenera* should be restricted to the Australian form, to which it has been applied for a long time, and that there is no necessity at all for its alteration."

Messrs. Rothschild and Hartert are acknowledged authorities on matters of nomenclature, so it is to be regretted that more care is not taken by them.

Vieillot wrote: "On recontre cette espèce dans l'Inde, au Bengale, à Pondichery, au Coromandel et a Malabar." The only mention of Australia is in the sentence I quote above, where "On le trouve aussi, selon Latham."

Vieillot's whole account is simply a translation of Latham's, and appears in the *Nouv. Dict. d'Hist. Nat.*, Vol. XXVIII., p. 280, 1819, under the name *Falco ponticerianus.*

Vieillot simply proposed the new name Haliætus girrenera for the whole species even as Lesson proposed in the *Traite*, p. 44, *Haliætus garuda.*

Whitlock (*Emu*, Vol. VIII., p. 177, 1909), wrote: "This beautiful Sea-Eagle (*Haliastur girrenera*) does not appear to travel far from the coast, and my acquaintance with it is by no means extensive. The first pair I ever saw in Australia I observed at Point Sampson, near Roeburne. These were flying about the creeks in that locality. I had reason to think that it might breed in the extensive mangroves bordering the network of creeks and backwaters at Port Hedland. So when I arrived at Condon, where conditions were similar, if on a smaller scale, I naturally looked for it there. I was not disappointed. My first walk at Condon was a trip up the coast to a rocky point and a neighbouring islet, accessible at certain stages of the tides. On my way I caught the gleam of a white head and neck amongst the mangroves. A closer approach revealed the whole bird, with its richly contrasting cinnamon-coloured upper-parts. Close at hand was its mate. Both birds were perched on the outer fringe of mangroves. The tide was rapidly coming in, and though I waded in up to the knees I found it useless at the moment to proceed further. However, though I subsequently made a thorough examination of this tract of mangroves, I eventually found the nest on the other side of the estuary and nearly a mile away. The actual site was quite close to the port, and in a clump of flourishing and quite massive mangroves, a little distance back from the open ocean. At low tide the nest would be about 20 feet from the sand, and at high spring tides the bottom of the nest cannot have been much above high water mark. The structure was evidently the accumulation of several years. It was quite 2 feet in height and about the same in width. There was just the semblance of a cup. The nest contained a young Eaglet about ten days old, which boldly faced me with extended wings and open beak. It showed no fear, and attempted no resistance when I handled it. I visited the nest twice, but saw nothing of the parent birds on either occasion. Though the nest was very substantial, none of the sticks of which it was composed was thicker than my little finger. The young Eaglet was in a nondescript stage of plumage—the head and neck mostly white, but with a tinge of cinnamon on the lower throat and breast; rest of under-parts whitish; back and wings mostly black, but flecked here and there with white down. Cere black. Tarsus naked and dull greenish yellow. Iris deep brown. Beak black. The adult birds have a peculiar appearance on the wing. The short white tail and white head and neck, and the great expanse of wing, make the body appear quite stunted. They were not unlike huge bats when the latter creatures are skimming along with outstretched wings. The call-note is a curiously modulated 'Pēē-ah-h-h,' the latter syllable rather long-drawn and uttered in a tremulous manner. I observed another fine pair in the neighbourhood of Port Hedland, but had no time to search for the nest."

Hill (*Emu*, Vol. X., p. 266, 1911) recorded from Kimberley, North-west Australia: "An uncommon bird. The nests are built in mangrove trees on the outer side of the coastal fringe, of sticks and a small quantity of grass and seaweed. Eggs were taken at Napier Broome Bay on 20/7/10. Crabs and cuttle-fish are the principal articles of food."

Mr. Tom Carter has given me the following note: "The handsome White-headed Sea-Eagle was common about the North-west Cape and as far south as Carnarvon (Sharks' Bay), where mangroves find their southern limit on the mainland, in any quantity. The birds seem to haunt the neighbourhood of mangroves, probably because their food supply is mainly obtained from the crabs that abound there. About the vast cliffs of the Yardie Creek gorge, near Point Cloates, I have often enjoyed seeing three or four pairs of this species in the early morning, playing or fighting in circles at a great height above the water. When so engaged, the birds constantly utter a peculiar 'mewing' cry, which resembles the note of a peacock. From about August to September the birds disappeared from the Yardie, doubtless being busy breeding in the large masses of mangroves further north towards the North-west Cape and in the Exmouth Gulf. I never succeeded in finding any eggs, but found a nest in some mangroves near the North-west Cape that apparently belonged to this species. The nest was a little larger than a Crow's and was well hidden in a thick mangrove tree. The ground below was littered with numerous fragments of yellow land crabs. When at Carnarvon in 1911, from August to October, one or two pairs of the birds were constantly close to the town in the estuary of the Gascoyne River and doubtless had a nest in some of the patches of mangroves. I have noted occasional birds at flooded inland plains, twenty-five miles from the nearest point of the sea. They ascended some distance up the vast channel of the Gascoyne River, hunting about the large scattered permanent pools. On one occasion, when living at Point Cloates, I found the dead bodies of a White-headed Sea-Eagle and a Brown Hawk with their claws fast entangled. They had fought 'a fight to a finish.' On several occasions I have known them eat poisoned pieces of meat laid for the dingoes and die from the effects."

Keartland's note in North's "Catalogue" reads: "The White-breasted Sea-Eagle (*Haliastur girrenera*) was frequently seen on the Fitzroy River, near its junction with the Margaret River, about one hundred and fifty miles inland from King's Sound, in North-western Australia. These birds were either perched on the topmost branches of the highest trees, or flying slowly near the surface of the water. The Aborigines assert that while perched they are either resting or looking for some unwary fish basking in the sunshine. Having discovered their intended victim, they fly close to the water and seize the fish as they pass over it. They construct large stick nests in the high trees on the margin of the Fitzroy River."

No. 302.

HALIASTUR SPHENURUS.

WHISTLING EAGLE.

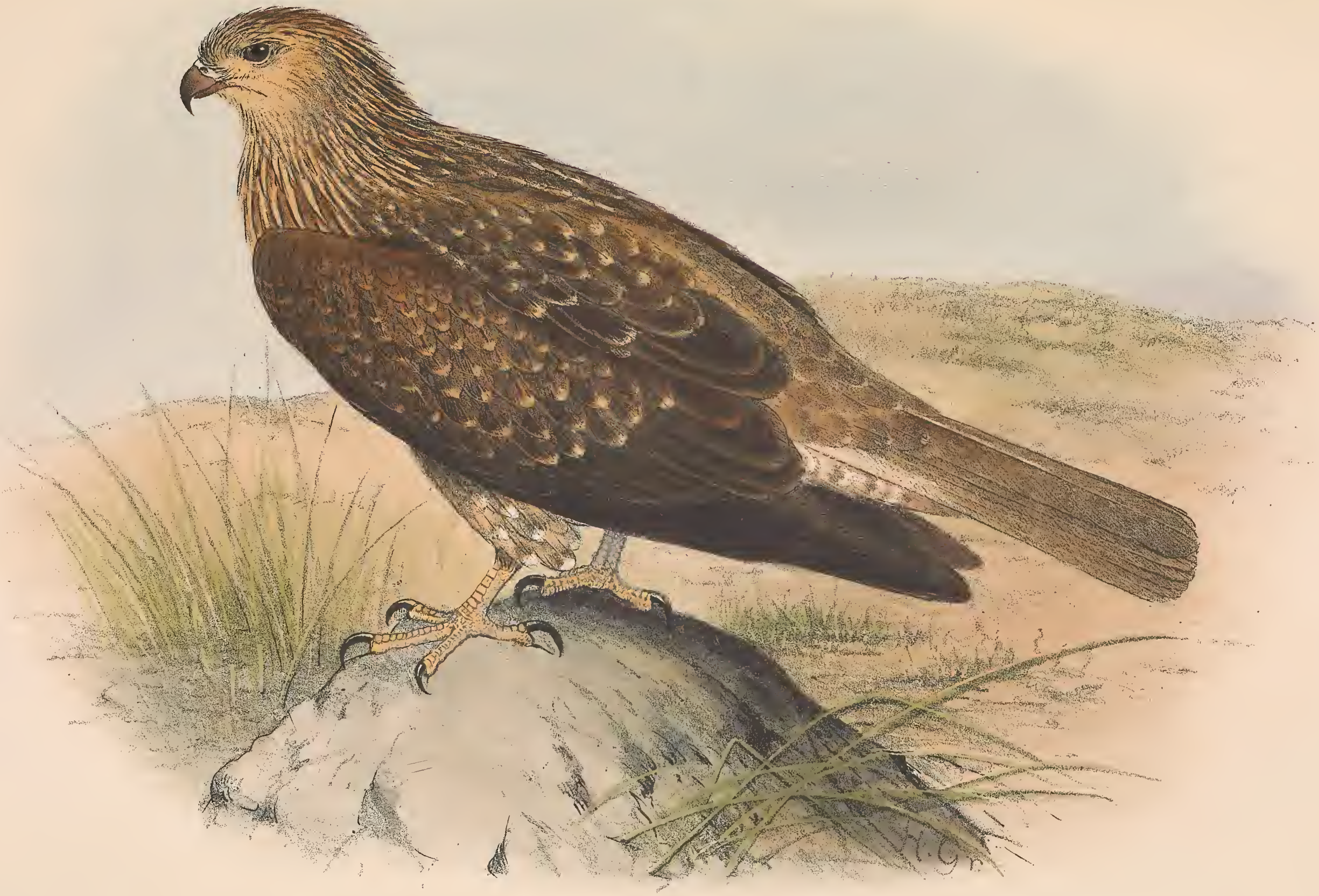
(Plate 245.)

Milvus sphenurus Vieillot, Nouv. Dict. d'Hist. Nat., Vol. XX., p. 564, 1818 : New South Wales.

Milvus sphenurus Vieillot, Nouv. Dict. d'Hist. Nat., Vol. XX., p. 564, 1818 ; *id.*, Gal. des Ois., Vol. I., pt. 2, pl. 15, 1822.

Haliæëtus canorus Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 187, 1827 : New South Wales ; Gould, Synops. Birds Austr., pt. III., pl. 40, 1838.

Haliastur sphenurus Gould, Birds Austr., Vol. I., pl. 5, 1848 ; *id.*, Handb. Birds Austr., Vol. I., p. 20, 1865 ; Ramsay, Proc. Zool. Soc. (Lond.) 1867, p. 393 (Q.) ; Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 316, 1874 ; Ramsay, Cat. Austr. Acc., p. 35, 1876 ; *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 177, 1878 ; Gurney, Ibis 1878, pp. 460, 466 ; Ramsay, Proc. Linn. Soc. N.S.W., Ser. 2, Vol. I., p. 1096, 1888 (N.W.A.) ; *id.*, *ib.*, p. 1141 (eggs) ; *id.*, Tab. List Austr. Birds, p. 1, 1888 ; Broadbent, Proc. Roy. Soc. Queensl., Vol. V., p. 14, 1888 (Q.) ; North, Austr. Mus. Cat., no. 12, p. 9, 1890 ; Keartland, Rep. Horn. Sci. Exped. Zool., Vol. II., p. 106, 1896 (Central) ; North, Austr. Mus. Cat., no. 4, p. 36, 1898 ; Hall, Key Birds Austr., p. 2, 1899 ; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 20, 1901 ; A. G. Campbell, Emu, Vol. II., p. 10, 1902 (Vict.) ; Le Souëf, *ib.*, p. 140, 1903 (N.T.) ; Carter, Emu, Vol. III., p. 33, 1903 (M.-W.A.) ; Hartert, Nov. Zool., Vol. XII., p. 208, 1905 (N.T.) ; D'Ombrain, Emu, Vol. IV., p. 125, 1905 (Vict.) ; Berney, *ib.*, Vol. V., p. 17, 1905 (Q.) ; Mulder, *ib.*, p. 42, 1905 (Vict.) ; Hill, *ib.*, Vol. VI., p. 177, 1907 (Vict.) ; Batey, *ib.*, Vol. VII., p. 2, 1907 (Vict.) ; Austin, *ib.*, p. 28, 1907 (N.S.W.) ; Cornwall, *ib.*, p. 171, 1908 (Q.) ; Mathews, Handl. Birds Austral., p. 41, 1908 ; S. A. White, Emu, Vol. VIII., p. 97, 1908 (S.A.) ; Whitlock, *ib.*, Vol. IX., p. 191, 1910 (W.A.) ; Mathews, *ib.*, Vol. X., p. 108, 1910 (N.W.A.) ; Ingle, *ib.*, p. 121, 1910 (Vict.) ; Ogilvie-Grant, Ibis 1910, p. 169 (W.A.) ; Hill, Emu, Vol. X., p. 266, 1911 (N.W.A.) ; Barnard, *ib.*, Vol. XI., p. 22, 1911 (Q.) ; North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 227, 1911 ; Mathews, Nov. Zool., Vol. XVIII., p. 249, 1912 ; *id.*, List Birds Austr., p. 108, 1913 ; Macgillivray, Emu, Vol. XIII., p. 151, 1914 (Q.) ; Barnard, *ib.*, p. 205, 1914 (N.T.) ; *id.*, *ib.*, Vol. XIV., p. 41, 1914 (N.T.) ; S. A. White, Trans. Roy. Soc. S.A., Vol. XXXVIII., p. 425, 1914 (Central) ; *id.*, Emu, Vol. XIV., p. 186, 1915 (Central).



H. Grönvold, del.

Witherby & C°

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HALIASTUR SPHENURUS.

(*WHISTLING EAGLE*).

WHISTLING EAGLE.

Halinertus sphenurus Heine and Reichenow, Nomencl. Mus. Heine, p. 267, 1890.

Haliastur sphenurus territori Mathews, Austral Av. Rec., Vol. I., p. 88, 1912: Mary River, Northern Territory.

Ictiniastur sphenurus Mathews, ante, p. 146.

DISTRIBUTION. Australia (not Tasmania). Extra-limital.

Adult male. Upper-parts pale brown with pale spear-head markings on the upper wing-coverts, mantle and back; the scapulars pale rufous towards the base mottled with brown; bastard-wing, primary-coverts and quills black, the inner webs of the latter rufous mottled with brown, the innermost secondaries brown at the tips and rufous towards the base; the second, third, fourth and fifth primaries incised on the outer webs and first to the fifth on the inner webs; tail-feathers dark grey tinged and mottled with rufous towards the base; crown of head and hind-neck brown lined with buffy-white, becoming ochreous-buff on the sides of the face and throat; the feathers on the fore-neck and breast lanceolate in form, creamy-white fringed with brown on the apical portion; abdomen, thighs, and under tail-coverts similar in colour but the feathers are normal in shape like the axillaries and under wing-coverts. Bill brown; eyes black; feet cream. Total length 600 mm.; culmen 28, wing 409, tail 250, tarsus 58. Figured. Collected at Ning-bing, 50 miles N.E. of Wyndham, North-west Australia, on the 30th of May, 1911.

Adult female. Similar to the adult male but larger. Wing 427 mm., culmen 29. Collected at Napier Broome Bay, North-west Australia, on the 30th of July, 1910.

Nestling. Covered with buff-coloured down, darker on the head and rump.

An example five weeks old is covered with white down, with brown feathers showing through, with wide buff-coloured centres; the wing-feathers darker with buff tips.

Immature. Has the head lighter than in the adult, the feathers of the mantle, neck and under-surface buff with darker edges; upper-surface dark brown, each feather with a buff pear-shaped tip; tail as in the adult; primaries and secondaries black with buff tips.

As the bird grows older it gets lighter, the markings on the upper-surface become smaller and are almost white.

Nest. Composed of sticks and lined with leaves. Outside measurements: 26 to 30 inches wide, 12 deep; inside, 6 inches wide by 3 deep.

Eggs. Clutch two. Bluish-white. The markings are most varied, from sparsely spotted with lavender to large blotches of reddish-brown. Axis 52-55 mm. Diameter 42-44. (April to July, Alexandria.)

Breeding-season. Practically all through the year.

THIS common bird was not discriminated by the early travellers, but in the *Gen. Synops.*, Suppl. II., p. 18, 1801, Latham described a bird under the title "Cinereous E(agle)" thus:

"This is of a large size; the bill is large and black: legs the same; the general colour of the plumage deep brown, but the under-parts are much paler, and the wings much darker than the rest; the rump and tail are very pale ash-colour, nearly white.

"This inhabits *New Holland*, and from its make and shape seems nearly allied to the *Cinereous Eagle*."

This quotation has been included in the synonymy of the present species, but it seems quite a doubtful association, and I have so far been unable to trace the source of Latham's description, whether it was made from a specimen or drawing. It is not included among the Watling Drawings and the first description appears to be that given by Vieillot as above quoted. Ignorant of Vieillot's bird, when Vigors and Horsfield dealt with the Linnean Society's Collection of Australian Birds they re-described it under the name *Haliaeetus canorus,* writing: "We have felt much hesitation in describing this bird as a new species, the specimen in the Society's collection being in bad condition, and in particular much faded in colour. We considered it to bear much resemblance, as far at least as could be judged from a figure, to the young of Dr. Latham's *Falco Novæ Zœlandiæ,* which species has been ascertained to belong to the Australian Fauna. But it does not well accord with Mr. Temminck's figures of that species, nor with those given in Forster's Drawings in the Banksian library. We consider it best to record it for the present as a distinct species, with an expression of doubt, until more perfect specimens permit us to speak with certainty.

"The native name of this bird is *Moru,* and also *Wirwin,* as we are informed by Mr. Caley. It is called the *Whistling Hawk* by the settlers. That gentleman adds that 'it makes a loud whistling noise when on the wing and sailing about in the air. It frequents the upper-parts of the harbour (Port Jackson) particularly about the Flats, a few miles below Paramatta. The natives tell me it feeds upon dead fish, and the bones (of fish, I apprehend) which they leave. The Flats is a noted fishing-place for the natives: the water there is shallow, and at ebb-tide a great portion of sand is left bare, which, with some marshy land adjoining, forms a convenient resort for several species of birds.' "

Gould's account is also worth quoting: "This species has been observed in every portion of Australia yet visited by Europeans. I did not meet with it in Tasmania: I am consequently led to believe that it rarely visits that island. In New South Wales it is quite as numerous in summer as it is in winter; not that it is to be observed in the same locality at all times, the greater or less abundance of its favourite food inducing it to wander from one district to another, wherever the greatest supply is to be procured. It never attacks animals of a large size, but preys upon carrion, small and feeble quadrupeds, birds, lizards, fish, and the larvæ of insects; and while on the one hand it is the pest of the poultry-yard, on the other no species of the *Falconidæ* effects more good during the fearful visitations of the caterpillar, a scourge of no infrequent occurrence in

Australia. So partial, in fact, is the Whistling Eagle to this kind of food, that the appearance of one is the certain prelude to the appearance of the other. It is generally to be seen in pairs, inhabiting alike the brushes near the coast and the forests of the interior of the country. It is incessantly hovering over the harbours and sides of rivers and lagoons for any floating animal substance that may present itself on the surface of the water or be cast on the banks; and when I visited the colony in 1839, it was nowhere more common or more generally to be seen than over the harbour of Port Jackson. Its flight is buoyant and easy, and it frequently soars to a great altitude, uttering at the same time a shrill whistling cry, from which circumstance it has obtained from the colonists the name of the Whistling Hawk."

Captain S. A. White has provided the following note: "The Whistling Eagle is a very common bird in South Australia, and in the autumn or early winter these birds come south in great numbers. I have seen twenty or thirty birds sitting in the trees or on the ground round a dead sheep waiting till the hide became soft enough to make an entrance. Great numbers frequent the large gums (*Eucalyptus rostrata*) growing on the banks of the dry water-courses in the far north at breeding time, and I have seen as many as three nests of these birds in the same tree. I have also known these birds to nest on my property at the Reed-beds and lay the second clutch in the same season; the first clutch is invariably three, the second two. These Eagles seem to prefer carrion to live prey, though I have seen them with lizards; I have, however, never seen them touch a live bird."

Dr. A. Morgan also states: "Found in all parts of South Australia. I found them especially common at Point Sturt on Lake Alexandrina—in the Flinders Ranges near Port Augusta—in the neighbourhood of Mt. Gunson and at Kallioota. They are easily recognised in flight by the heavy flapping and by the wide separation of the ends of the primaries: the loud whistling note is audible at a distance of half-a-mile or more. They feed largely upon rabbits, where these are procurable, and upon dead fish when near lakes or the sea. The nest is built of sticks and lined with green leaves or she-oak needles; a new nest is quite a small structure, but the same one is used year after year, a little being added each time until it becomes enormous. It is generally placed high up in a gum tree, but at Point Sturt, where there are nothing but she-oaks, the largest of these was always selected. I also found a nest at Kallioota in a large pine-tree and another in a tall black oak (*Casuarina* sp.). When not breeding, the nests are used as feeding platforms, and on and beneath them is always found a great collection of rabbit bones and castings of fur, etc. They do not object to carrion and will eat fish in an advanced state of putrefaction. They lay two or three eggs, which vary from almost white to white with a plentiful sprinkling of reddish spots: they have a green lining. Average size of 19 eggs 5.66 cm. × 4.35 cm.; largest egg 6.10 × by 4.50: smallest egg 5.20 × 4.05 cm. Earliest date on which I have taken eggs Aug. 18th: latest date Sept. 24."

Mr. Thomas P. Austin writes: "Very numerous throughout this district (Cobbora, New South Wales), and at certain times of the year its whistling cry can be heard almost the whole day long. I have never actually known this species to kill anything for food, as it is a carrion feeder, but last year (1914) one of these birds was always hovering about my fowl yard, and one of my men informed me that it did kill the chickens and young turkeys, so I shot it. They breed here in very large numbers, and at almost any time of the year; I have taken their eggs in ten months of the year, January and February being the exceptions. From July 1907 till June 1913 I took one hundred and ten sets of their eggs, and with the exception of four clutches they were all taken within the boundary of the above estate (8,000 acres). The following will show their principal breeding time during the above-mentioned period. I have taken them in sets as—March 6 sets, April 12 sets, May 6 sets, June 10 sets, July 19 sets, August 16 sets, September 16 sets, October 16 sets, November 7 sets, and December 2 sets. The usual clutch is only two eggs, but on thirteen occasions I have taken sets of three eggs. Mr. Sep Robinson informed me that he has twice taken clutches of five eggs, none of which were addled. I think this must have been the result of two birds laying in the same nest."

Mr. A. G. Campbell, concerning the Birds of North-eastern Victoria (*Emu*, Vol. II., p. 10, 1902) notes: "The Goshawk (*Astur approximans*), Sparrowhawk (*Accipiter cirrhocephalus*), Little Eagle (*Nisaëtus morphnoides*) and Whistling Eagle (*Haliastur sphenurus*) are constant visitors during summer, autumn, and winter, but depart evidently for more suitable breeding grounds during spring. The last named species may often be seen, three, four or five together on a fine day, sailing round and upward in large circles, occasionally uttering their curious whistle-like cry. One often wonders what is the object of such soaring."

Berney (*Emu*, Vol. V., p. 17, 1905) from Queensland observed: "These are always here—a common bird with us. They eat either offal or live prey, generally the former, for, not being very quick on the wing, they are unable to obtain the latter unless circumstances are very favourable.

If not smart, they are at least dexterous on the wing. On one occasion I had an opportunity of seeing one of them swoop at a family of young domestic Ducks (a few days old) and take two of them, one in each talon. I could hardly credit my own eyes, but an hour later, hearing a disturbance among the poultry, I was out just in time to see the Eagle carry off two more, in spite of the Ducks' foster-mother—a valiant old hen. Unfortunately I had no gun handy at the time. They fall very ready victims to baits put out for Eagles (Wedge-tailed) and dingoes, which is a pity, as they do a lot of good clearing up offal and killing grasshoppers. My earliest record regarding their nesting is 13th May (1904), when I found a nest with one chick in a mixed covering of down and feather, the former predominating; my latest date is 28th August (1903), when I found two nests, each with two eggs. The conspicuously spotted plumage of the immature bird is much more handsome than that of the adult. I should say these Eagles pair for life."

In the same part of the *Emu*, p. 42, is this note: "In the *Geelong Naturalist* (Dec. 1904), Mr. J. F. Mulder has the following observation: 'In going over one of the forest rises I came suddenly upon a Mountain Duck (*Casarca tadornoides*), which was standing about forty yards away in front of me. It appeared hurt, for as I rode it flapped along the ground, dragging its legs behind it, the acting being so clever that I really thought it had been shot. I was not the only one deceived. A pair of Whistling Eagles (*Haliastur sphenurus*) kept swooping down on it as it was fluttering along the ground. When the Eagles darted down, the Duck lay flat in the dust, but started on again when I approached. My suspicions were aroused by its getting gradually further away. At last it rose straight up in the air, rivalling the Eagles themselves in vigour of flight, and disappeared.' "

Hill (*Emu*, Vol. VI., p. 177, 1907) noted of the north-west of Victoria: "Usually found along the creeks, where the topmost branches of the red gums are selected for nesting-places. These birds are numerous throughout the year, but become more plentiful in December and January, when they are attracted by the smell of poisoned rabbits."

In the *Emu*, Vol. VII., p. 28, 1907, Mr. T. P. Austin wrote: "Very numerous, especially recently (20-4-07). I counted thirty-two practically in a flock. It is no uncommon thing to see half-a-dozen birds in the same tree. A great many of them breed here; I have several times seen two nests in the same tree."

E. M. Cornwall, regarding Mackay, North Queensland, recorded (*Emu*, Vol. VII., p. 171, 1908): "A more plentiful species is the Whistling Eagle

(*Haliastur sphenurus*). Nests may be found wherever the timber is tall enough to suit them, and many have been found near the town. The nesting season starts about August: young birds were noted on 27th October, and on the same date a nest was examamined which proved to be nicely lined and ready for eggs. These birds frequently use their old nests as 'feeding tables'; on several occasions, after a laborious climb to a nest on which a bird had been observed sitting, it was found to be quite flattened out, and on it were remains of food, such as snakes, fish, etc., which the bird had left there."

Mr. Tom Carter has written me: "The Whistling Eagle is a common species in the Mid-west, but is much rarer in the South-west. I do not recollect seeing any south of the Swan River. They are usually wary and difficult to shoot, soaring in circles at a considerable elevation above inland fresh-water lakes and pools. They haunt the vicinity of water, to prey upon Ducks and other water-fowl. When at a large fresh-water pool near the Minilya River (Mid-west), Sept. 8, 1911, I shot three White-headed Stilts. Two were dead and one winged only. I laid down my gun and was taking off my boots and socks preparatory to retrieving the birds, when a Whistling Eagle swooped down, about 40 yards from me, and momentarily dropping its legs, daintily picked up one of the dead birds in an instant without rippling the water. The thing was done so quickly I did not realise what had happened, until I saw that one of the dead birds was gone. I then waded in, and picked up the other dead bird, but the winged one swam into deeper water, so that I could not reach it, so shot it again, killed it, and saw it drift to the other side of the pool with a strong wind that was blowing. I then walked round the end of the pool to secure it, but before I reached it another Whistling Eagle seized and took it away too. This species usually lays two eggs in a bulky nest in a main fork of a large tree. I only once noticed 3 eggs in a nest. The nesting cavity is usually lined with fresh leaves from the tree, in which is the nest, usually a white Gum in the Mid-west. July 18-22, 1900. Found three nests: one contained two fresh eggs, another two incubated eggs, and the third young in down. July 14, 1901. Nest with two incubated eggs. When climbing to one of the above nests a pair of *Graucalus melanops* (Black-faced Cuckoo Shrikes) made a great fuss about my head, scolding me loudly. Upon reaching the eagle's nest I looked down into the lower branches of the tree, and saw the nest of the *Graucalus* containing three eggs. As usual, it was a frail structure, and being built on the top of a fork in a branch, was quite invisible from beneath it."

WHISTLING EAGLE.

Mr. Tom Tregellas sent me a specimen, writing with it: "The specimen I am sending was shot at Yan Yean, the reservoir from which the water supply of Melbourne is drawn. The birds are fairly common in boggy or swampy country, where they may be seen hovering by the hour on the look-out for anything in the eating line. Although *they* are common, it is not at all common to be enabled to get a shot at one, as they are very wary and seem to be ever on the look-out for a possible enemy. At Swan Island I saw a good many of them, and at Westernport also they were fairly numerous, in fact *too* numerous, as there was always one who saw me sneaking on another and warned him."

North, in the *Aust. Mus. Spec. Cat.*, no 1, Vol. III., 1911, pp. 227-236, has given a lot of interesting and valuable notes concerning habits and nidifications. Regarding the former I extract the following. Firstly he records: "It is, however, of rare occurrence near the city and quite different from Gould's time. . . . The note is a loud whistling cry, resembling 'chu chu chu chu chu,' rapidly repeated several times, and when once heard can be easily distinguished from that of any other of the Australian Accipitres. Although uttered during the day, it may frequently be heard just about dusk, and again occasionally through the night." Mr. T. P. Austin's notes are novel and worthy of reproduction: "Just before *Haliastur sphenurus* begins nesting in its normal breeding-season, it will often congregate in very large flocks, more often near water, a shallow swamp being a favourite place. I once counted fifty-two birds flying practically in a flock, just soaring round and round over a few acres. Upon another occasion I saw twenty of these birds fly from a Red Gum tree growing by itself on the edge of a swamp, and there were many others flying about. Sometimes these assemblies will be kept up off and on for two or three weeks, and their loud whistling cries may be heard the whole day long. After these congregations are broken up (which is not always done suddenly) a great many of the birds are seen in pairs; this is the time I notice they whistle most. A pair of birds having decided upon a nesting tree, and not having commenced building, will whistle at irregular intervals throughout the day. I find they vary very considerably in the time they take to build their nests; in the majority of cases where they build a new nest, they take as near as I can judge about a month from the commencement until the first egg is laid; but when a pair of birds occupy a previous season's nest, they at times take much longer to build it up again. Why this is I have not been able to discover, unless it is that they take possession of the nest they used the year previous, long before they have any intention of laying, simply to prevent other birds from using it. One instance in particular, which came under my notice during 1909, is perhaps worthy of mention. About the end of April I several times saw a pair of Whistling Eagles standing on the side of a nest which had been built the previous season; this sort of thing continued until towards the end of August. In the meantime, a pair of Ravens built their nest in the same tree, from which I took five eggs on August 17th. Shortly after this I was busy with the shearing for a few weeks, after which, while riding past the tree, I saw two young Whistling Eagles sitting upon the Ravens' nest, and the old Eagles' nest was not used at all during that season. I find that the birds on the whole vary as much in their habits as they do in their plumage at various ages. They are extremely erratic in the time they commence breeding, although, strictly speaking, they practically breed the whole year, but still they have what might be called their proper nesting season. During 1907 I took the first set of eggs on July 10th, 1908 April 13th, 1909 May 18th, and 1910 March 5th. Their breeding appears to be governed by the amount of food there is for them; for instance, during 1907 all the rabbit destruction here was done with phosphorus, and most of the rabbits died in their burrows, and the Eagles could not get them, so food was scarce, and I only took four sets of their eggs during the whole year. During 1908 we had a very serious drought, and heavy losses in stock all through the winter, consequently there was plenty of food for the Eagles, and I took thirty-two sets of their eggs. During 1909 I used strychnine to poison the rabbits, and spring traps for the first time; again there was a plentiful supply of food, and I took thirty sets of their eggs. In 1910 I again used strychnine and spring traps, and being a cool summer I commenced rabbit destruction at the beginning of the year. The result was this species commenced nesting earlier than I have ever known before and I took thirty-five sets of their eggs. . . . Their food consists principally of rabbits (in these parts), and yet I have never seen them kill one themselves, and I very much doubt if they ever do so, excepting they might occasionally take a very young one. Many of their old nests have the remains of rabbits in them. The food which I think they prefer to all others is the ground 'Iguana' or Lace Lizard (*Varanus varius*). I have several times seen about half-a-dozen making a meal off one of these reptiles, but I very much doubt if they killed it themselves." Mr. Savidge observed: "It preys upon larger birds, poultry included, and small mammals; about the swampy lands Coots and Redbills, etc., are its principal food." Dr. Macgillivray added: "This bird, when the Darling River is in flood, and the muddy water forces the fish to swim near the surface, has frequently been noticed to swoop down and pick them up with its claws, a habit which has earned it the name of 'Fish Hawk,' bestowed upon it by those that live along the river: this habit must be regarded as an interesting instance of reversion." Other notes by other observers all serve to emphasize this bird's habits and nesting habits, but not much novelty is expressed. The whistling habit is variously construed, one writer recording it from a district where another observer failed to remark it, and so on.

There is much variation in the plumage without any distinct shades being determined by geographical conditions, and I am therefore recognising no subspecies at the present time. This is mainly due to the ignorance of the plumage-changes and consequent inability to fix accurately the perfectly adult birds, especially as birds breed in immature plumage.

I separated in the *Austral Avian Record*, Vol. I., p. 88, 1912, the birds from North-west Australia and Northern Territory under the name *Haliastur sphenurus territori*, the type being from Mary River, Northern Territory, with the diagnosis: "Differs from *H. s. sphenurus* in being darker generally; it it also smaller."

Though most Western birds are darker, and there is on the average a slight difference in measurement, I temporarily reject this form, as the shade is too slight for necessity.

As previously noted, the species is practically confined to Australia, only ranging to New Guinea and New Caledonia, while not a native of Tasmania. Though I have not recognised any subspecies in Australia, I propose to name the New Caledonian race

Haliastur sphenurus sarasini, subsp. nov.

I find the birds from this locality are lighter and smaller than typical birds, and I now observe that North has recorded: "Specimens from New Caledonia are often of a much lighter colour, especially on the upper portion of the head, neck and scapulars," while Sarasin has also noted the difference in coloration and smaller size.

GENUS—MILVUS.

MILVUS Daudin, Hist. Nat. Buffon, ed. Didot, Quadr., Vol. XIV., p. 221, 1802 .. .. Type *M. milvus.*
(ex Lacepède, Tableau Oiseaux, p. 4, 1799: nom. nud.)

Hydroictinia Kaup, Classif. Saugeth. u. Vögel, p. 115, 1844 .. .. Type *M. migrans.*

Also spelt—
Hydrictinia, Heine and Richenow, Nomencl. Mus. Hein., p. 264, 1890.

MEDIUM-SIZED Aquiline birds with short bills, long wings, very long forked tail, small legs and feet.

The bill is short, rather elongately curved, with large cere; the loreal bristles encroach but do not cover the nostrils, which are oblique ovals with internal bony tubercle: the lower edges of upper mandible slightly sinuated.

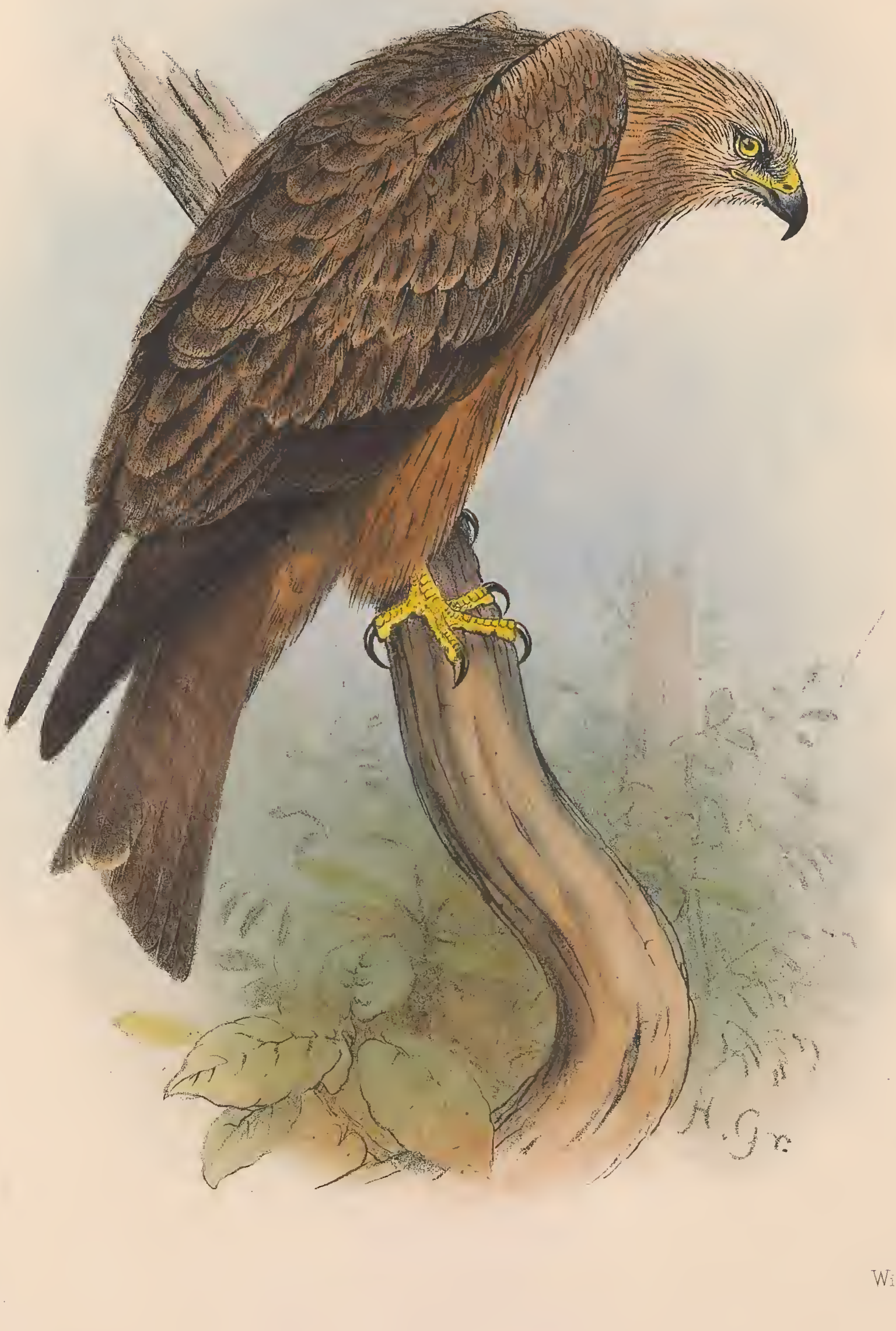
The wing is long with the first primary short, about equal to seventh, the second shorter than the sixth, the third, fourth and fifth subequal.

The tail is very long, more or less deeply forked, and more than half the length of the wing.

The legs are short and the feet small: the tarsus feathered for half its length in front but not at the back; a few broad scutes are seen in front, but otherwise the tarsal covering consists of reticulate scales.

The toes are short, the middle toe less than the length of the tarsus.

The Australian Kite would belong to *Hydroictinia,* but this seems unrecognisable, as the tail, though shorter, is still forked, and no other differences are superficially apparent. Anatomical examination might show greater differences between the subspecies of "*Hydroictinia*" than between "*Hydroictinia*" and *Milvus.*



H. Grönvold. del.

Witherby & C°

1/3

MILVUS AFFINIS.

(ALLIED KITE).

No. 303.

MILVUS MIGRANS.

ALLIED KITE.

(Plate 246.)*

Falco migrans Boddaert, Tabl. Plan. Enlum., p. 28, 1783: no locality=France (Hartert).

Milvus affinis Gould, Synops. Birds Austr., pt. III., pl. 47, Apl., 1838: New South Wales.

Milvus affinis Gould, Synops. Birds Austr., pt. III., pl. 47, Apl., 1838; *id.*, Proc. Zool. Soc. (Lond.) 1837, p. 140, Dec., 1838; *id.*, Birds Austr., Vol. I., pl. 21, 1848; Sturt, Exped. Centr. Austr., Vol. II., App., p. 15, 1849; Gould, Handb. Birds Austr., Vol. I., p. 49, 1865; Diggles, Orn. Austr., pt. I., pl. 11, 1866; Ramsay, Proc. Zool. Soc. (Lond.) 1867, p. 393 (Q.); Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 323, 1874; Ramsay, Proc. Zool. Soc. (Lond.) 1875, p. 579 (Q.); *id.*, Cat. Austr. Acc., p. 37, 1876; *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 177, 1878; Gurney, Ibis 1879, p. 72 *et seq.*; Ramsay, Proc. Linn. Soc. N.S.W., Ser. II., Vol. I., p. 1096, 1887 (N.W.A.); *id.*, Tab. List Austr. Birds, p. 1, 1888; North, Austr. Mus. Cat., no. 12, p. 10, 1890; *id.*, Rep. Horn. Sci. Exped. Zool., Vol. II., p. 55, 1896; Keartland, Trans. Roy. Soc. S.A., Vol. XXII., p. 166, 1898 (N.W.A.); North, Austr. Mus. Cat., no. 4, p. 39, 1898; Hall, Key Birds Austr., p. 2, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 22, 1901; Hall, Emu, Vol. II., p. 63, 1902 (N.W.A.); H.E.H., *ib.*, p. 122, 1902 (Central); Le Souëf, *ib.*, p. 140, 1903 (N.T.); Carter, *ib.*, Vol. III., p. 33, 1903 (N.W.A.); Berney, Emu, Vol. V., p. 17, 1905 (Q.); Mathews, Handl. Birds Austral., p. 41, 1908; *id.*, Emu, Vol. IX., p. 67, 1910 (N.T.); Hill, *ib.*, Vol. X., p. 267, 1911 (N.W.A.); North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 236, 1911; Macgillivray, Emu, Vol. XIII., p. 151, 1914 (Q.); Barnard, *ib.*, p. 205, 1914 (N.T.); *id.*, *ib.*, Vol. XIV., p. 41, 1914 (N.T.)

Milvus aterrimus Gould, Proc. Zool. Soc. (Lond.) 1837, p. 99, 1838: nomen nudum.

Hydrictinia affinis Heine and Reichenow, Nomencl. Mus. Heine, p. 264, 1890.

Milvus korschun affinis Mathews, Nov. Zool., Vol. XVIII., p. 249, 1912; *id.*, List Birds Austr., p. 108, 1913; *id.*, Ibis 1914, p. 109 (N.T.); S. A. White, Trans. Roy. Soc. S.A., Vol. XXXVIII., p. 425, 1914 (Central).

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* The Plate is lettered *Milvus affinis.*

Milvus korschun napieri Mathews, Nov. Zool., Vol. XVIII., p. 249, 1912: Napier Broome Bay, North-west Australia.

Distribution. Australia: not Tasmania. Extra-limital.

Adult female. General colour above brown with white bases to the feathers, upper wing-coverts earth-brown, the feathers tinged with rufous and having dark shaft-streaks; the scapulars brown with pale edges; bastard-wing, primary-coverts, and quills blackish, or dark brown, becoming paler on the innermost secondaries, with an indication of dark bars both on the inner primaries and secondaries, the second, third, fourth and fifth primaries incised on the outer webs and the first to the fifth on the inner webs; tail greyish-brown with numerous dark bands and somewhat paler at the tips; crown of head and hind-neck rufous-brown with dark shaft-streaks; sides of face and throat similar but paler; under-surface rufous-brown with broad shaft-lines; outer edge of wing below somewhat paler than the inner portion; lower aspect of tail-feathers grey with dark bars on the inner webs. Bill black, cere and base yellow, eyes brown; feet yellow. Total length 555 mm.; culmen 24, wing 403, tail 260, tarsus 50. Figured. Collected at Derby, North-west Australia, on the 9th of May, 1911, by Mr. J. P. Rogers.

Adult male. Similar to the adult female. Wing 400 mm.; tarsus 57. Collected on the King River, North-west Australia, on the 5th July, 1911.

Immature are lighter: head with buffish feathers and darker bases; the mantle has lighter tips to the feathers; lower throat with a light stripe down both sides of the dark shaft. Abdomen with whitish centres to the feathers: the feathers of the thighs have a light arrow-shaped spot. Eyes golden-yellow.

Nestling. "The young, when hatched, are covered with fawn-coloured down, with a lighter space round the eyes; irides brown; legs and bill greenish in colour." (Macgillivray.)

Nest. The usual structure made of sticks and lined. Sometimes a deserted nest of another species.

Eggs. Clutch, two or three. Whitish (inside lining green), marked, more at the larger end, with reddish-brown blotches and smaller markings. Axis 51 mm.; diameter 49.

These historical eggs are the ones described by Mr. A. J. North in the Austr. Mus. Cat., no. 12, p. 381, and have a note to that effect written by "A. J. N."

Breeding-season. September to January (South). May to July (North).

There seems to have been no recognition of either of the Australian Kites until 1837, when Gould named both species.

Previously "Kites" had been mentioned by the early travellers, but apparently excited little interest, and no particular notes are given. No figures appear among the Watling Drawings, nor were any included in the Linnean Society's Collection studied by Vigors and Horsfield. The reason seems to be that they do not regularly dwell on the sea-coast but only spasmodically occur there.

Dr. A. M. Morgan has written me: "I have only met with this bird in two localities in South Australia: at Elizabeth Creek, about 120 miles N.W. of Port Augusta, and at Kallioota. At Elizabeth Creek they were hanging about a slaughter-yard and feeding upon the offal. At Kallioota a pair were constantly flying about the homestead picking up any scraps or offal they could find: at neither place were they nesting."

Gould's notes read: "With the single exception of Tasmania, it is universally dispersed over all the Australian colonies. It is quite as common on the Coburg Peninsula as it is in the southern portions of the country: and that it is as abundant in the centre of Australia as it is near the coasts is shown by Captain Sturt having observed it flying in great numbers over the far interior; but Mr. W. Allan informs me, in a letter dated August 8, 1859, 'that there is an uncertainty, or rather an irregularity, in its appearance in different parts of the country. During a residence of nine years on the River Manning, I never saw a single example of the bird until a few months ago, when it appeared on the flats bordering the river in flocks of forty or fifty in number. As far as I can learn, they previously appeared on the banks of the Hunter; they have now left, but are plentiful at Port Macquarie: they seem, therefore, to be journeying northward. I am told that they appeared in a similar manner about twenty years ago.' The confident and intrepid disposition of this bird renders it familiar to everyone, and not unfrequently leads to its destruction, as it fearlessly enters the farmyard of the settler, and, if unopposed, impudently plays havoc among the young poultry, pigeons, etc. It is also a constant attendant at the camps of the aborigines and the hunting-parties of the settlers, perching on the small trees immediately surrounding them, and patiently waiting for the refuse or offal. The temerity of one individual was such, that it even disputed my right to a Bronze-winged Pigeon that had fallen before my gun, for which act it paid the penalty of its life. The flight of this bird, which is closely allied in character to that of the *Milvus ater* of Europe, is much less protracted and soaring than that of the typical Kites; the bird is also much more arboreal in its habits, skulking about the forest after the manner of the true Buzzards. Great numbers have been observed hovering over the smoke of the extensive bush-fires so common in Australia, closely watching for lizards and any of the smaller mammalia that may have fallen victims to the flames, or have been driven by the heat from their lurking-places."

Capt. Sturt's notes referred to by Gould are: "The Allied Kite is common over the whole continent of Australia. They are sure to be in numbers at the camps of the natives, which they frequent to pick up what may be left when they go away. They are sure also to follow any party in the bush for the same purpose. About fifty of these birds remained at the Depôt, with about as many Crows, when all the other birds had deserted us, and afforded great amusement to the men, who used to throw up pieces of meat for them to catch in falling. But although so tame that they would come round the tents on hearing a whistle, they would not eat anything in captivity, and would have died if they had not been set at liberty again. It was this bird which descended upon Mr. Browne and myself in such numbers from the upper regions of the air as we were riding on some extensive plains near the Depôt in the heat of summer. There can be no doubt but that in the most elevated positions, where they are far out of the range of human sight, they mark what is passing in the plains below them." Sturt's account of the above incident is graphically given: "The morning we started to pay a visit to the blacks was more than usually oppressive even at daybreak, and about 9 it blew a hot wind from the north-east. As we rode across the stony plain lying between us and the hills, the heated and parching blasts that came upon us were more than we could bear. We were in the centre of the plain when Mr. Browne drew my attention to a number of small black specks in the upper air. These spots, increasing momentarily in size, were evidently approaching us very rapidly. In an incredibly short time we were surrounded by several hundreds of the Common Kite, stooping down to within a few feet of us, and then turning away, after having eyed us steadily. Several approached us so closely that they threw themselves back to avoid contact, opening their beaks and spreading out their talons. The long flight of these birds, reaching from the ground into the heavens, put me strongly in mind of one of Martin's beautiful designs, in which he produces the effect of distance by a multitude of objects gradually vanishing from the view. Whatever the reader may think, these birds had a most formidable aspect, and were too numerous for us to have overpowered if they had really attacked us. That they came down to see what unusual object was wandering across the lonely deserts over which they soar, in the hope of prey, there can be no doubt; but seeing that we were likely to prove formidable antagonists, they wheeled from us in extensive sweeps and were soon lost to view in the lofty region from whence they had descended."

Berney's notes from the Richmond District, North Queensland, are: "Next to the Crow, this is the most common bird in the district. I seem to have but few notes concerning them, on account, I expect, of their very commonness. My diary records eggs and youngsters during February and March. *Milvus affinis* is the most useful scavenger we have about a homestead or camp, cleaning up and carrying away all offal (and it is in the carrying away that it beats the Crow) or scraps, which would otherwise attract flies and cause sickness. At favourable feeding grounds, such as slaughter-yards, they assemble in great numbers. They are useful, too, as grasshopper destroyers."

In the *Austr. Mus. Spec. Cat.*, No. 1, North gives, as usual, a good account of the nidification and habits of this bird, but not as complete as usual, apparently "*on account of its very commonness.*" From this source I take the following notes. Mr. K. H. Bennett wrote: "*Milvus affinis* is only an occasional visitant to this district (Mossgiel, New South Wales), appearing here at uncertain intervals in incredible numbers, and remaining for more or less lengthened periods, sometimes over twelve months. I first saw them in 1856, when they came in thousands. On four or five occasions they have since appeared in equally large numbers, but always with an interval between each visitation, but for the last eight years (written in 1886) only an occasional straggler has appeared. . . . The food of this bird consists chiefly of offal and garbage of all kinds, and the only prey I have seen it attempt to capture are grasshoppers, of which they destroy great numbers, flocks of Kites following the flying cloud of insects, darting in among them and clutching one or more in each claw, devouring them while on the wing. At certain times the grasshoppers deposit their eggs just beneath the surface of the ground, on bare patches on the plains, and this is another harvest for the Kites, who assemble in large numbers, scratch up and devour the eggs. I have frequently seen several of these birds hovering over the fowl-yard when the fowls were being fed, and darting down, snatch a bit of bread or meat from an unwary hen, but never attempting to capture the smallest chicken." Later, in 1889, Mr. Bennett observed: "As a rule, the prey of this bird consists of insects, small reptiles, etc., to which offal is added whenever obtainable, but this year the prey, judging from the quantity of remains in the nests, as well as on the ground beneath, consists chiefly of rabbits of all sizes, which, considering the comparative weakness of this bird's talons, is somewhat singular." This is confirmed by Dr. Macgillivray, who wrote from Broken Hill, New South Wales: "The dark form of *Milvus affinis* may often be observed circling round nearly every homestead and camp throughout the district, always on the look-out for stray scraps of meat, and not despising a chicken or young bird. To see them flying around overhead or flapping lazily along over the creek timber, one is apt to imagine the Kite a slow bird, but to see the same bird swoop for a piece of meat or other object on the ground, the illusion is dispelled, the swoop being lightning-like in rapidity and accuracy. They are never seen in such numbers here as in the Gulf District in Queensland. Their chief food here is the eternal rabbit, mostly young ones, and also smaller mammals and reptiles." Other notes confirm again the habits and food of this bird, without adding anything new.

The following notes refer to the Western form which I separated in 1912, but which here I do not uphold as hereafter discussed.

Mr. Tom Carter writes me: "The Allied Kite occurred in great numbers in the Mid-west in good seasons, but was much more numerous inland than on the coast. They were particularly plentiful inland from Point Cloates in 1900, and at times were a distinct nuisance as I drove over some of the densely-grassed plains, as several of the birds would accompany the buggy in order to feed upon the grasshoppers, etc., disturbed from the grass, and at times flew so close to the horses' heads as to make them frightened. The birds seemed to catch the insects with their feet, from which they ate them as they flew along, without alighting. Several nests containing eggs were seen between July 19th and 22nd in that year. The clutch was two, the nests being built near the ends of horizontal branches, and were rather flat in shape, and lined with leaves off gum trees."

Keartland, in the *Trans. Roy. Soc. S.A.*, Vol. XXII., p. 166, 1898, recorded: "These tropical scavengers were not seen until the Fitzroy River was approached early in November, but on our arrival at the telegraph station at the Crossing they were very numerous. All along the road from the Derby to the Margaret River they may be seen in hundreds. During the heat of the day they seek shelter from the sun amongst the branches of the various trees, but both morning and evening they are either on the wing soaring overhead or seeking food on the ground. Nothing in the shape of carrion seems to come amiss to them. They are very tame and are useful in clearing away the offal when cattle are slaughtered. They seldom attack poultry and consequently are not molested. Grasshoppers form the chief portion of their food. They build their loose stick nests in the Baobab trees during March and April."

Hill, in the *Emu*, Vol. X., p. 267, 1911, concerning the birds of Kimberley, North-west Australia, observed: "Grass fires and the consequent harvest of lizards, small mammals and insects, attracted many Hawks in April, May and June, amongst which Kites were prominent. Great daring is shown by these fine birds in the pursuit of their prey, and it is not an unusual thing to find their wing- and tail-feathers much damaged by fire. In August and September I saw many Kites in the town of Derby, where they were doing good work as scavengers."

Mr. J. P. Rogers, from the North-west, also recorded (*Emu*, Vol. II., p. 63, 1902): "12-10-01. The Kites have nearly all left Livuringa for a time. To-day (8-2-00) the Kites were back in Livuringa in great numbers.

They seem to leave here in October, and return about February-March, and only an odd one is to be seen in the hot season. Mr. M'Larty, the manager of the station, gives this as his opinion, and considers they go to spend the wet season about the centre of the Kimberley goldfields (the high country about Hall's Creek). On 14-3-00 they were in large numbers about Livuringa station."

In my "List" I used as the specific name *Milvus korschun,* based on *Accipiter korschun* S. G. Gmelin, *Nov. Comm. Acad. Petrop.,* Vol. XV., p. 444, 1771: South Russia.

In the recent B.O.U. List this name was rejected, the reasons being stated thus, p. 380: "Sharpe proposed to use Gmelin's *Accipiter korschun* (*Nov. Comm. Petrop.,* Vol. XV., 1771, p. 444) for the Black Kite, but the description seems quite unintelligible, and the figure appears to represent a Marsh-Harrier, so that the Committee propose to retain *Milvus migrans* (Bodd.) 1783 (*cf. Ibis,* 1874, p. 360; 1875, p. 503; 1879, p. 72; and *Newton Dict. Birds,* p. 491)."

This conclusion was acquiesced in by the Authors of the *Hand-List of British Birds,* who published the correction in *British Birds,* Vol. IX., p. 6, 1915, thus: *Milvus migrans migrans* Boddaert "instead of *M. k. korschun* (Gm.) which must be abandoned, as the description of *Accipiter korschun* S. G. Gmelin does not agree with that of any *Milvus,* in fact it appears to refer to a young *Circus æruginosus,* with the description of which the author seems to have mixed his notes referring to a *Milvus.*"

I would add I agree that the description is not applicable to any *Milvus* as at present understood, but would go further and state that *Accipiter korschun* is based *absolutely* on the immature of *Circus æruginosus,* and that there is no reference to any *Milvus* in our sense of that word. When Gmelin made his comparisons he wrote "*similis milvo,*" and stated it was so like in manners, etc., that it might only be a variety and not a distinct species. This is the only reference to "*milvus,*" and it appears to have been overlooked that at that time "*milvus*" was used for the HARRIER. In the *Nederlandsche Vogeler,* Vol. I., published in 1770 by Nozeman and Sepp, there is a plate of a Marsh-Harrier headed "*Milvus æruginosus,*" and the text to this also bears the same heading. A nest is also given which is entitled "*Milvi nidus.*"

This usage of the name *Milvus* appears in the Additions and Corrections of Sherborn's *Index Animalium,* p. lix., as the earliest introduction of that name generically, and if that were accepted a change would be necessary, as *Milvus* would have to replace *Circus* and *Hydrictinia* would come into use vice *Milvus.* I have not made this alteration, as Nozeman and Sepp are certainly not binomial in their nomenclature, and I do not think that the change would be acceptable even if it were decided that these writers were binary, according to the idea of the International Commission. If such a decision were made, it would certainly prove the means of forcing a policy of *nomina conservanda* which has been so much scoffed at by the very ones who have forced this incorrect interpretation of the word "binary."

I now agree in rejecting *korschun*, and I think since all present-day works are now unanimous in accepting Boddaert's name of *migrans*, that no reversion to *korschun* will again take place. The plate upon which Boddaert's name is founded is not a good one, though it would appear to have been painted from this bird, to which, however, the Black Kite is a decided misnomer.

That the Australian bird can only be regarded as a subspecies of the European one is certain, and I here give a short account of the vicissitudes of the name.

In the *Cat. Birds Brit. Mus.*, Vol. I., 1874, Sharpe recognised four species thus: p. 322, *Milvus korschun=migrans*; p. 323, *Milvus affinis*; p. 324, *Milvus melanotis*; and p. 325, *Milvus govinda.* No detailed discussion of these was given, so in the *Ibis* 1879, p. 71 *et seq.*, Gurney gave full particulars of the inter-relationship of these and I quote the following (p. 76): "The geographical ranges of the eastern species of the genus *Milvus* are especially difficult to define with accuracy, in consequence of the very remarkable and perplexing manner in which these species or races merge into one another. The smallest of the *Milvi*, the Australian *M. affinis*, contrasts conspicuously in its dimensions with the great Japanese *M. melanotis*: and yet the one species is connected with the other by a gradation of specimens so continuously intermediate, both in size and coloration, that, though it may be convenient to adopt the view of Mr. Sharpe, which is also that of Mr. Hume, that the series is divisible under the three specific heads of *M. affinis, M. govinda* and *M. melanotis*, the boundary lines between these three species seem to me not to be capable of so precise a definition as to be entirely satisfactory. . . . The specific name of '*affinis*' was given by Mr. Gould to the *Milvus* inhabiting Australia. . . . The Kite inhabiting Ceylon and the smallest specimens of Indian Kites so closely resemble the typical *M. affinis*, that I have long been in the habit of referring them to that species; but their average size is slightly larger, and the great majority of specimens have more or less white on the under-surface of the primaries, frequently presenting a decided white patch. . . . Captain Legge, in his article on the

Ceylon Kite (*op. cit.* p. 81) considers that the Ceylon bird belongs to a race not absolutely identical either with the Australian *Milvus* or with the 'ordinary brown-plumaged bird of the plains of India.' . . . The Kite of Ceylon and the smallest Indian Kites appear, in fact, to hold a position intermediate between the typical *M. affinis* of Australia and the ordinary Indian Kite. . . . Mr. Hume writes: '*Affinis* and *govinda* inosculate, so that while some Indian specimens are absolutely identical with the Australian *affinis*, others may be met with which it is difficult to decide whether to assign to *govinda* or *affinis*.' "

The matter of the Indian Kites was much written about, the smallest ones being continually referred to Gould's *M. affinis*, and no conclusion was unanimously arrived at, though it will be noted that Gurney and Legge both noted that Australian specimens were still less, on the average, than the smallest Indian birds.

In the *Fauna of British India Birds*, Vol. III., 1895, Blanford included: p. 374 *Milvus govinda* = *M. affinis* Gould, p. 377; *M. melanotis* and *M. migrans* p. 378, explaining (p. 376): "It will be seen from the synonymy that I do not separate *M. affinis*, the Australian bird, found also in India, and distinguished by smaller size and by the absence of any white mottling at the base of the inner webs of the primaries. Every gradation may be found in India between birds with a large white patch beneath the wing (*M. palustris* Anderson) and those without any white, and the latter, if of small size, are identical with Australian specimens. Burmese birds are, as a rule, darker than Indian, both above and below, but the character is not constant, and Australian birds resemble those of India, not those of Burmah, in colour." *M. melanotis* was regarded as being "a migratory bird in India" from the north as far as "Japan and Southern Siberia in summer," while *M. migrans* was only admitted from "Southern Afghanistan, around Quetta."

A complete and scientific review of the question was prepared by Meyer and Wiglesworth in the *Birds of Celebes*, Vol. I., pp. 57-60, 1898. I would extract the following: "It should be borne in mind that *M. govinda* and the large *melanotis* are only worthy of subspecific separation from *M. migrans* of the western Palæarctic Region. In India the two forms possibly do not intergrade. It is inconceivable that a race, hardly separable for *M. govinda* at the best, should occur as an independent breeding bird intermingled with the latter. . . . There is evidently a difference at least in size between the race of Australia and that of Burmah, which is spoken of by Mr. Oates and others as *affinis*. . . . The Australian specimens in the British Museum are also on the whole somewhat more rufous than Indians or Tennaserim ones. . . . Thus we conclude that there are neither two nor three species of Kite in India, but two (or three) subspecies, one of which proceeds to further racial variation in other localities, Ceylon, Celebes, Australia. . . . For the present it seems best to treat of *M. migrans* as consisting of four subspecies, viz.:

The typical *M. migrans* ..	Europe, N.W. Africa, Asia east to Tomsk, Afghanistan.
M. m. melanotis T. and Sch.	East Siberia, Japan, India, Burmah.
M. m. govinda Sykes ..	Afghanistan, India, Ceylon, Burmah to New Guinea.
M. m. affinis Gould ..	Australia.

They characterized the last as 'size small: more rufous.'"

The preceding will sufficiently indicate the interest that has been taken in these Kites, and a recent reviewer is Dr. Hartert, who has dealt with these in the *Vögel palaarkt. Fauna* in the part already published, but which is not in my hands.

My own conclusion is that however many races may be admitted (and it is certain more than four will be), the Australian one is quite recognisable on account of its more rufous coloration and its very small size. It may be that with long series we should have to treat this species by the method I have indicated under *Haliastur indus.*

Thus the Celebes birds may be regarded as intermediate between the Burmese birds and the Australian ones; the Ceylon ones intermediate between the Indian and the Australian birds; the North Indian ones intermediate between the Japanese and Chinese birds and the Central Indian ones, and so on.

Owing to this perplexing state of affairs and ignorant of Dr. Hartert's published views, I prefer simply to cite the whole of the Australian birds under the subspecific *affinis;* by no method of classification can *affinis* possibly be regarded as a species. Gould himself noted the very close alliance of *affinis* and *migrans,* though disputing their absolute identity.

GENUS—LOPHOICTINIA.

LOPHOICTINIA Kaup, Isis 1847, p. 113 .. .. .. Type *L. isura.*

MEDIUM-SIZED Aquiline birds with small slender bills, slight crest on head, very long wings, long almost square tail and small legs and feet.

This form is distinguished from *Milvus* by the tarsal covering, but the bill is more slender, wings comparatively longer, tail comparatively shorter, and legs weaker and covered with reticulate scales throughout.

In the wing the fourth primary is the longest, the third primary about equal to the fifth, the second equalling the sixth, and the first less than the seventh.

The tail is practically straight, really emarginate, and is little more than half the length of the wing.

The legs and feet are small; the tarsus is half-feathered in front but naked behind: the reticulate scales are large in front, smaller behind.

This is a most interesting form, apparently evolved from *Milvus*, as far as can be judged from superficial characters. It differs chiefly in the tarsal covering and the development of a nuchal crest. It would belong to the first northern immigration, while *Milvus* would belong to the second. It is noteworthy that the feet have structurally altered, and the tail shortened without much alteration in the coloration.

No. 304.

LOPHOICTINIA ISURA.

SQUARE-TAILED KITE.

(Plate 247.)

Milvus isurus Gould, Synops. Birds Austr., pt. III., pl. 47, 1838 ; New South Wales.

Milvus isurus Gould, Synops. Birds Austr., pt. III., pl. 47, 1838 (Apl.) ; *id.*, Proc. Zool. Soc. (Lond.) 1837, p. 140, Dec. 1838 ; *id.*, Birds Austr., Vol. I., pl. 22, 1841 ; *id.*, Handb. Birds Austr., Vol. I., p. 51, 1865 ; Zuchold, Journ. für Orn. 1858, p. 35 (Q.) ; Ramsay, Proc. Zool. Soc. (Lond.) 1875, p. 579 (Q.) ; Gurney, Ibis 1879, p. 83 ; Witmer Stone, Austral Av. Rec., Vol. I., p. 145, 1913.

Milvus isiurus Kaup, Isis 1847, p. 116.

Lophoictinia isura Bonaparte, Rev. Mag. Zool. 1854, p. 534 ; Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 326, 1874 ; *id.*, Proc. Zool. Soc. (Lond.) 1875, p. 338 (Q.) ; Ramsay, Cat. Austr. Acc., p. 38, 1876 ; *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 177, 1878 ; Gurney, Ibis 1879, p. 84 ; *id.*, List Diurn. Birds Prey, p. 81, 1884 ; Broadbent, Proc. Roy. Soc. Queensland, Vol. III., p. 25, 1887 (Q.) ; Ramsay, Tab. List Austr. Birds, p. 1, 1888 ; North, Aust. Mus. Cat., no. 12, p. 11, 1890 ; *id.*, *ib.*, no. 4, p. 41, 1898 ; Hall, Key Birds Austr., p. 2, 1899 ; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 23, 1901 ; Le Souëf, Emu, Vol. II., p. 141, 1903 (N.T.) ; Hall, Key Birds Austr., 2nd Ed., p. 2, 1906 ; Austin, Emu, Vol. VII., p. 28, 1908 (N.S.W.) ; Mathews, Handl. Birds Austral., p. 41, 1908; Gibson, Emu, Vol. IX., p. 72, 1909 (S.W.A.) ; Crossman, *ib.*, p. 149, 1909 (S.W.A.) ; Ogilvie-Grant, Ibis 1910, p. 169 (W.A.) ; Hill, Emu, Vol. X., p. 267, 1911 (N.W.A.) ; North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 240, 1911 ; Mathews, List Birds Austr., p. 108, 1913 ; Macgillivray, Emu, Vol. XIII., p. 151, 1914 (N.Q.) ; Barnard, *ib.*, Vol. XIV., p. 41, 1914 (N.T.) ; S. A. White, Trans. Roy. Soc. South Austr., Vol. XXXVIII., p. 425, 1914 (Central).

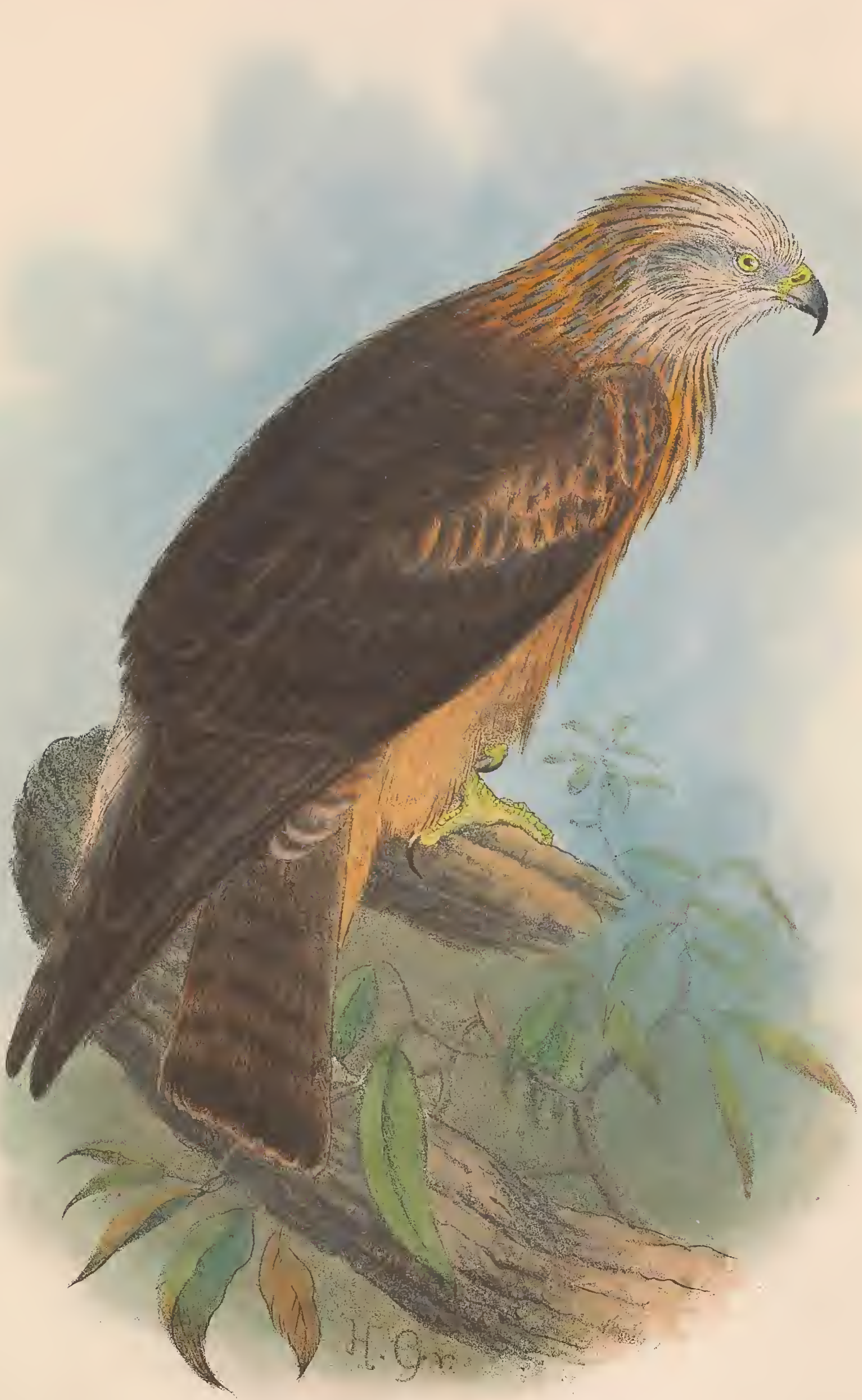
Milvus pacificus Strickland, Ornith. Synon., p. 135, 1855.

Milvus isurus isurus Mathews, Nov. Zool., Vol. XVIII., p. 250, 1912.

Milvus isurus westraliensis Mathews, *ib.* ; Perth, West Australia.

Distribution. Australia (*not* Tasmania).

Adult female. Back, scapulars, innermost secondaries and flight-quills blackish-brown, with pale edges and white bases to the feathers ; lesser upper wing-coverts blackish, those on the shoulder brown with buff edges and dark shaft-lines, the median



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LOPHOICTINIA ISURA.

(SQUARE - TAILED KITE)

coverts more or less rufescent at the tips; bastard-wing, primary-coverts and quills black, outer primary-quills hoary-grey on the outer webs which are incised on the second to the sixth above and the first to the fifth below, basal portion of the outer primaries for the most part white, decreasing in extent towards the inner ones which are almost entirely brown with blackish obsolete bars; secondaries blackish, paler on the inner webs and white at the base; rump and upper tail-coverts dark brown with fluffy-white bases, some of the lateral coverts rufescent; tail-feathers pale brown with indications of dark bars and a broad subapical dark band and white edgings at the tips; nape, hind-neck, mantle, sides of neck and fore-neck rufous with hoary-grey middles and black shaft-lines to the feathers, the grey decreasing in extent on breast and abdomen where the feathers are rufous with only a dark shaft-streak like the under tail-coverts, axillaries and under wing-coverts; some of the long flank-feathers greyish-brown barred with white towards the base; fore-head, sides of face and throat white with black hair-like shaft-streaks; greater series of the under wing-coverts and quill-lining silvery-grey with blackish-brown markings; lower aspect of tail silvery-grey marked with pale brown. Iris light yellow; feet yellow; bill horn-colour: cere yellow. Total length 572 mm.; culmen 31, wing 480, tail 270, tarsus 50. Figured. Collected on the Dawson River, Queensland, on the 28th of August, 1910.

Adult male. Similar to the adult female. Wing 483. This and the female are a breeding pair of birds shot from the nest.

Birds from Perth, West Australia, are darker and smaller. Male: culmen 30 mm., wing 455, tarsus 49. Collected near Perth on the 7th of November, 1904, and is the type of *Lophoictinia isura westraliensis* (Mathews).

Nest. A large structure made of sticks and lined with leaves. Outside measurements, 40 inches wide by 20 deep; inside, 14 inches by 3 deep.

Eggs. Clutch, two to three; no gloss, buffy-white, boldly spotted with reddish-brown and lavender. Axis 52-54 mm. Diameter 37-40.

Breeding-season. August to November.

Gould first brought this bird to the notice of scientific ornithologists, and it does not appear to have been noted previously by any writer.

His account reads: "This species, although possessing the short feet, long wings and other characters of the true Kites, particularly of the *Milvus regalis* of the British Islands, may at once be distinguished from that bird by the square form of its tail. I met with it in various parts of New South Wales, both in the wooded districts near the coast and on the plains bordering the interior; still, it is by no means abundant, and persons who had been long resident in the colony knew but little about it. I had, however, the good fortune, in one instance, to find its nest, from which I shot the female. I have received two specimens from Swan River. . . . It is a true Kite in all its manners, at one time soaring high above the trees of the forest, and at others hunting over the open wastes in search of caterpillars, reptiles and young birds. . . . In his notes from Western Australia Gilbert remarks it is there 'always found in thickly-wooded places. Its flight at times is rapid, and it soars high for a great length of time. . . . I have not observed it in the lowlands, but it appears to be tolerably abundant in the interior. The stomach is membranous and very capacious: the food mostly birds.' "

Dr. Macgillivray notes (*Emu*, Vol. XIII., p. 151, 1914): "Quite the most plentiful of the Hawk tribe throughout the Gulf country, where dozens may be seen in the air at a time. They nest on the smaller coolibah creeks on the downs country, and seldom on the main rivers. On 23rd March, 1910, Mr. McLennan visited one of these creeks, and made the following note: 'Went to a waterhole about 8 miles from camp. Found four Kites' nests containing two eggs each, one with one egg, and one ready for eggs. Two old nests were also found, under one of which were seven lizard's eggs. These nests were at an average height of 12 feet from the ground.' "

Even North, in the *Austr. Mus. Spec. Cat.*, No. 1, has few notes concerning this bird and only two original ones regarding its nidification. I extract the following by Mr. H. G. Barnard of Duaringa, Queensland: "As shewing the partiality of the Accipitres for old nests, one in which three young Square-tailed Kites were reared last year is this year occupied by a Little Eagle, and a nest occupied last year by a Brown Hawk is now occupied by a Square-tailed Kite. Again, in June 1907, a pair of Wedge-tailed Eagles rebuilt an old nest, and when ready for the eggs for some reason deserted it: the nest is now occupied by a pair of Brown Hawks. Birds of prey are very fond of company, as the following will illustrate. Where the first nest of *Lophoictinia isura* was found there were nests also of *Hieracidea orientalis* with three young, *Nisætus morphnoides* with one young, *Astur approximans* building, from which I afterwards took a set of four eggs, *Accipiter cirrhocephalus* building on same date as I took set of *Astur approximans* eggs: I took a set of four from this nest. At the second nesting-site of *Lophoictinia isura* were nests of *Hieracidea orientalis* with young, and nests of *Astur approximans* building, and *Accipiter cirrhocephalus* with three eggs. The third colony contained the same species. Only one pair of each species was in each colony. An Ironbark (*Eucalyptus*) ridge seemed the favourite locality. The birds resort to the same place year after year to breed if not disturbed. The food of the Square-tailed Kite consists of young birds, which are evidently in many cases taken from the nest, as a nest of *Ptilotis fusca* with a dead fledgeling clinging to it was found in one of their nests. They also eat insects, as a large Mantis was dead in one nest, and was evidently left there for the female."

As contrary to Gilbert's experience, Mr. Tom Carter has written me: "The long-winged Kite occurs sparingly about Broome Hill, and is destructive to poultry. On October 20, 1912, I was skinning a bird that had been shot by a neighbour while attacking his fowls. I dissected its gizzard to ascertain its contents, and to my surprise found a long oval egg unbroken inside it. This egg was marked like an unusually well marked specimen of the ground lark, and puzzled me, until on examining it through a magnifier, I found that it was really an egg of *Cuculus inornatus* (Pallid Cuckoo) that was completely covered over evenly with fragments of egg shells of *Anthus australis*, several of which the Kite had eaten too."

Though ranging on the West as far south as Broome Hill, it does not come south save as a rare straggler on the East of Australia. Thus, Mr. Edwin Ashby has written me: "I send you particulars of the occurrence of a female *Lophoictinia isura* at Blackwood, South Australia, on the 12th October, 1913. It has never been recorded in the Adelaide district before, as far as any of our South Australian ornithologists are aware. None of them had any skins. In the crop were three small unhatched birds, probably sparrows, also fragments of egg shell: in stomach were one unhatched bird and egg-shell, apparently a *Myzantha* or *Anthochœra*, and fragments of a mature bird, species doubtful. It is not only remarkable that this bird should be so far out of its ordinary habitat, but also evidence of a most undignified behaviour on the part of this huge bird: to come down to robbing bird's nests of eggs and unfledged birds is a prostitution of its great powers of flight."

In the *Nov. Zool.*, Vol. XVIII., p. 250, 1912, I separated the Western bird on account of its smaller size and darker upper and lower coloration. Few specimens are further available, but these confirm this, and for the present the status of the Western form is doubtful. In the present place I am not admitting it as valid, but it seems a form that will later certainly gain acceptance.

An explanation of the synonym *Milvus pacificus* Strickland is necessary. In the *Ornith. Synonyms* Strickland made use of this term basing it upon *Falco pacificus* Latham, who described a bird under that name in the *Suppl. Index Ornith.*, p. xiii., 1801. This was founded on his account of the Pacific Falcon described in the Second Supplement to the *General Synopsis*, p. 54, 1801, as follows: "The length of this bird is from sixteen to eighteen inches; the bill, legs and irides yellow; the head and most part of the neck are white, but the rest of the plumage in general is brown, blotched on the back with dark spots, and marked on the belly (which is paler than above, and inclining to yellow) with black streaks. The tail is long, even at the end, crossed with seven or eight oblique black bars; the quills are also barred as the tail, with the ends black. This was met with in *New South Wales*, and probably is not a numerous species, as only one has been shot, though others have been now and then seen."

This description was based on a painting made by Watling, and when Gould, Gray and Strickland examined these paintings they were unable to recognise the species. Later Strickland allotted it to the present species as above quoted, but which the description does not warrant, and he was never followed.

When Sharpe worked through the Watling Drawings, he was ignorant of the prior work of the above. In the *Hist. Coll. Nat. Hist. Brit. Mus.*, Vol. II., p. 111, 1906, Sharpe wrote: "I am unable to identify the bird here figured. It has a white head and neck . . . (Latham's account) is a good description of the painting, but I cannot find any Australian bird of prey which corresponds with it. . . . The only species which it could possibly resemble might be a young *Falco hypoleucus*, but our specimens in the Museum do not favour the idea."

I have many times examined the Watling Drawing No. 13, but I have been unable to attach it to anything, and put the name in Appendix B, p. 327, of my *List of the Birds of Australia*, writing: "The only guess at identity is Strickland's 'may be a peculiar state of *Milvus isurus*.'"

GENUS—GYPOICTINIA.

GYPOICTINIA Kaup, Isis 1847, p. 114 .. .. .. Type *G. melanosterna.*

Also spelt—
Gypsictinia Kaup, Isis 1847, p. 120.
Gypsoictinia Gray, Genera Birds, Vol. I., p. 11, 1849.

MEDIUM-SIZED Aquiline birds with comparatively large bills, long wings, medium tail and stout legs and feet. The bill is long, sharply pointed, with a large cere in which the nostrils are seen as large obliquely-set ovals semi-operculate: the upper mandible has the edges sinuate. The wing is long with the first primary less than the sixth; the second, third, fourth and fifth are almost subequal, the third and fourth equal and longest. The tail is practically square and is less than half the length of the wing.

The legs and feet are strong; the tarsus is very thick, and feathered one-third down the front but not at the back; the tarsal covering consists of reticulate scales, a row down the front being larger but not developed enough to be considered as scutes: they may otherwise be regarded as scutes diminished so as to appear as reticulate scales.

The systematic position of this genus must be regarded as uncertain until its osteology has been studied. First considered as a Buzzard, and so called in the vernacular still, it is at present systematically ranked with the Kites; but I am not convinced that the final word has been said on its classification. Superficially, it cannot be regarded as an Australian evolution from *Milvus*, so that it may yet be proven to have descended from the Buteonine branch.

Order FALCONIFORMES *Family AQUILIDÆ.*

No. 305.

GYPOICTINIA MELANOSTERNA.

BLACK-BREASTED BUZZARD.

(PLATE 248.)*

BUTEO MELANOSTERNON Gould, Proc. Zool. Soc. (Lond.) 1840, p. 162, 1841: Interior New South Wales.

Buteo melanosternon Gould, Proc. Zool. Soc. (Lond.) 1840, p. 162, 1841; *id.*, Birds Austr., Vol. I., pl. 20, 1848; Diggles, Orn. Austr., pt. XXI., 1870 (Q.); Witmer Stone, Austral Av. Rec., Vol. I., p. 146, 1913.

Milvus melanosternon Kaup, Isis 1847, p. 114.

Milvus leucosternon Kaup, Archiv. f. Naturg. 1850, p. 33 (error pro. *melanosternon*).

Gypoictinia melanosterna† Bonaparte, Rev. Mag. Zool. 1854, p. 534; Gould, Handb. Birds Austr., Vol. I., p. 47, 1865; Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 335, 1874; *id.*, Proc. Zool. Soc. (Lond.) 1875, p. 339 (Q.); Ramsay, Cat. Austr. Accip., p. 40, 1876; *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 177, 1878; Gurney, Ibis 1878, p. 459; Bennett, Proc. Linn. Soc. N.S.W., Vol. VI., p. 146, 1882 (N.S.W.); Gurney, List Diurn. Birds of Prey, p. 82, 1884; Ramsay, Proc. Linn. Soc. N.S.W., 2nd Ser., Vol. II., p. 165, 1887 (N.W.A.); *id.*, Tab. List Austr. Birds, p. 1, 1888; *id.*, Suppl., Cat. Austr. Accip., p. 8, 1890; North, Aust. Mus. Cat., no. 12, p. 11, 1890; *id.*, *ib.*, no. 4, p. 43, 1898; Hall, Key Birds Austr., p. 2, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 25, 1901; Carter, Emu, Vol. III., p. 33, 1903 (M.-W.A.); Berney, *ib.*, Vol. V., p. 17, 1905 (Q.); Mathews, Handl. Birds Austral., p. 41, 1908; Macgillivray, Emu, Vol. X., p. 19, 1910 (N.S.W.); Mathews, *ib.*, p. 108, 1910 (N.W.A.); Barnard, *ib.*, Vol. XI., p. 22, 1911 (N.Q.); North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 243, 1911; Hill, Emu, Vol. XII., p. 255, 1913 (N.T.); Mathews, List Birds Austr., p. 109, 1913; Macgillivray, Emu, Vol. XIII., p. 151, 1914 (N.Q.); Barnard, *ib.*, p. 205, 1914 (N.T.); *id.*, *ib.*, Vol. XIV., p. 42, 1914 (N.T.); S. A. White, Trans. Roy. Soc. S.A., Vol. XXXVIII., p. 425, 1914 (Central).

Gypoictinia melanosterna melanosterna Mathews, Nov. Zool., Vol. XVIII., p. 250, 1912.

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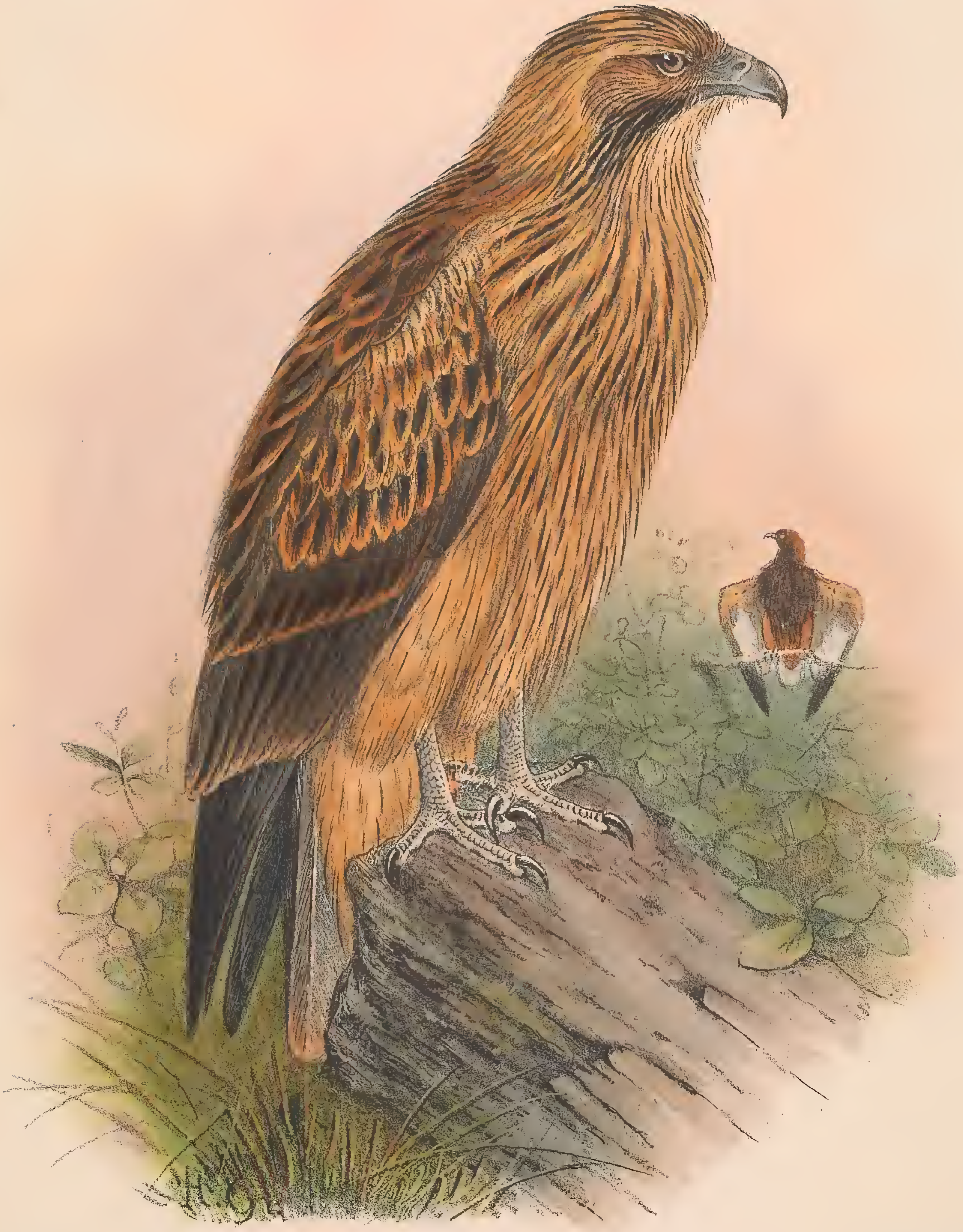
* The Plate is lettered *Gypoictinia decepta.*

† The specific name has been variously spelt *melanosterna*, *melanosternum*, and *melanosternon*: these spellings have not been discriminated.



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GYPOICTINIA DECEPTA.

(NORTHERN BUZZARD).

BLACK-BREASTED BUZZARD.

Gypoictinia melanosterna decepta Mathews, Nov. Zool., Vol. XVIII., p. 250, 1912 : Parry's Creek, North-west Australia.

Range. New South Wales ; Queensland ; Northern Territory ; North-west Australia ; South Australia.

Adult female. General colour above dark brown with white bases to the feathers and tawny rufous margins, which are rather broad on the upper wing-coverts and narrower on the head and hind-neck where the feathers are lanceolate in form ; bastard-wing and primary-coverts blackish with whitish on the inner webs of the former and paler tips to the latter ; the first, or outer, primary black, the remainder hoary-grey with white bases to the inner webs, the second, third, fourth, fifth and sixth black on the apical portion, all of which are incised on the outer webs and the first to the fifth are incised on the inner webs ; secondary-quills brown, paler on the inner webs, which are more or less mottled with white and edged with the same at the tips, the innermost secondaries paler brown ; tail-feathers hoary-grey with pale edges at the tips and white mottling on the inner webs ; sides of face, throat and entire under-surface pale smokey-brown, paler on the throat, thighs, and under tail-coverts, with dark shaft-streaks to the feathers which are wider on the breast ; a black moustachial patch on the fore-cheeks ; greater under wing-coverts greyish-brown with white bases. Bill, upper and tip of lower mandible brown ; cere, lores and rest of bill leaden-grey ; eyes light greyish-brown ; feet and legs greyish-white. Total length 543 mm. ; culmen (without cere) 32, wing 450, tail 201, tarsus 67. Figured. Collected on Parry's Creek, North-west Australia, on the 4th of February, 1909, by Mr. J. P. Rogers.

Adult male similar to the female. Wing 446 mm., culmen 32, tarsus 67. Collected at Point Torment on the 13th of April, 1911.

A pair collected at Marngle Creek, North-west Australia, measure :—

Male ...	Wing	463	culmen	33	tarsus	64 mm.
Female ...	,,	468	,,	33	,,	64 ,,

A pair from Alexandria in the Northern Territory measure :—

Male ...	Wing	437	culmen	31	tarsus	68 mm.
Female ...	,,	440	,,	34	,,	68 ,,

Very old birds have the head and breast quite black.

Nestlings are covered with buffy down ; dark brown on the rump and lores.

Nest. A large structure made of sticks and lined with leaves.

Eggs. Clutch, two ; white to buff, boldly blotched with reddish-purple and lavender. Axis 58-64 mm. ; diameter 44-51.

Breeding-season. September to December.

This is one of the finest, if not *the* finest, of the many Australian birds of prey first described by Gould, and as little has since been recorded regarding this still rare bird I quote his account : " This fine species does not appear to be common in any of the Australian colonies. I have, however, received it from Swan River, and procured it myself during my journey into the interior of New South Wales, about two hundred miles northwards of Sydney ; I have also a specimen which was killed on the Liverpool Plains by one of the natives of New South Wales. The Black-breasted Buzzard generally flies high in the air, through which it soars in large circles, much after the manner of the Wedge-tailed Eagle, its black breast and the large white mark at the base of the primaries being very conspicuous when seen from beneath. In these soaring actions it differs slightly from the typical species of the genus *Buteo*—an additional reason for its separation from these birds, and for the adoption of the distinctive generic appellation assigned to it by Dr. Kaup. A most singular story respecting this bird has been transmitted to me, and is here given as I received it: without vouching for its truth, I may remark that the testimony of the natives from whom it was derived may generally be relied upon: 'The natives, Mr. Drummond and his son, Mr. Johnson Drummond, tell me,' says Mr. Gilbert, 'that this bird is so bold, that upon discovering an Emu sitting on her eggs it will attack her with great ferocity until it succeeds in driving her from the nest, when, the eggs being the attraction, it takes up a stone with its feet, and while hovering over the nest lets it fall upon and crush them, and then descends and devours the contents. I have had numerous opportunities of observing the bird myself and can bear testimony to its great powers of scent or vision, for upon several occasions, when the natives had placed a small kangaroo or kangaroo rat in the fork of a tree, or on the top of a *Xanthorrhœa* with the intention of taking it again on our return, we have found that the Black-breasted Buzzard had discovered and during our short absence had devoured every part of it, except the skin, which was left so perfect that at first I could not believe it had not been done by the hand of man.' The sexes are alike in colouring, but present the usual difference in size, the male being the smallest."

Berney, in the *Emu*, Vol. V., p. 17, 1905, gives the following note: "The Buzzard is only seen occasionally (Richmond District, North Queensland), but at times in pairs, and then almost invariably flying high in large circles. With one exception I have never seen them at rest. When seen on the wing, a good guide to their identification is the conspicuous pure white patch in the centre of the outstretched wing, which is formed by the bases of the first six primaries. They are not credited, as a rule, with being carrion-eaters, but I poisoned one at a dead kid that I had put as a bait for Eagles. It is the only specimen that I have been able to handle, and from it took the following measurements: Total length 22⅜: wing 18, tail 8½, tarsus 3, culmen 1½ inches; spread of middle and hind-toe 4⅜ inches; spread of wings 5 ft. 1¼ in. The general plumage was black-brown and dull chestnut-red, put on in a very patchy and mottled manner. Shortly after this I was attracted to a knot of birds that I took to be Eagles at a dead lamb, but which on nearer approach I was surprised to find were Black-breasted Buzzards, no less than six of them feeding on a nest of half-a-dozen Emu eggs, all broken and all fresh. In the nest—a cushion of dry grass—was a round stone, the size of a domestic hen's egg, that I am sure was never put there or left there by the Emu. Now, by what means was the news of the discovery of that Emu's nest spread to gather up half-a-dozen of what is with us certainly a rare bird? I would not have thought there were that number of the Buzzards within a hundred miles of the place. I remember one being shot at Homestead, on the Campaspe River (N.Q.), where it had swooped at a flock of Whistlers (*Dendrocygna eytoni*) that were preening themselves on the banks of a lagoon, and carried one off to a neighbouring coolibah, from which it was shot, Buzzard and Duck coming to ground together. The gunner was congratulating himself on obtaining two birds with one stone, or rather, shot, when the Duck cleared off, seemingly none the worse for its rough experience."

Dr. Macgillivray in the *Emu*, Vol. XIII., p. 151, 1914, wrote: "From the notes made by Mr. McLennan, the Gulf country (Queensland) seems to be the headquarters of this fine species. He found them along all the Gulf rivers, and more than once noted as many as five females in the air at the same time. Several old nests were found in late summer and autumn, but were used only as roosting and feeding platforms. The birds evidently nest at the same time as in western New South Wales, as early in July on the Leichhardt river a bird was flushed from a nest which was newly lined with green leaves. They were noted on several occasions at Lockerbie and Paira, at Cape York."

It would be interesting to have McLennan's opinion of the differences in the sexes, as I note he is reported as observing "five females in the air at the same time." I make some comments on the supposed differences hereafter.

The story of the Buzzard breaking the eggs of the Emu, given with doubt by Gould, was confirmed by Mr. K. H. Bennett in 1881, and then by Berney as quoted above. Though Gould appeared sceptical, it does not seem a very strange procedure, as it simply is a reversal of the procedure of Thrushes with snails and Gulls with bivalve molluscs. These take the object up and let it fall upon a stone or hard earth in order to break it. It is then not a much more unlikely proceeding for the Buzzard, having tried this and found the contents escape, to reverse the procedure and drop the stone on the egg. The story of the Buzzard frightening the Emu off by walking up to it flapping its wings is the improbable part to me.

Many notes relating to this rare bird are given by North in the *Austr. Mus. Spec. Cat.*, No. 1, and from there I quote the following: "Mr. K. H. Bennett's notes made at Mossgiel, New South Wales, read: '*Gypoictinia melanosternon* preys to a great extent on various reptiles, such as snakes, frill-necked and sleepy lizards: it has also the singular habit of robbing the nests of Emus and Bustards of their eggs. The manner in which they effect the abstraction of the Emu eggs—as told me by the blacks—shows an amount of cunning and sagacity that one would scarcely give the bird credit for, and is as follows: On discovering a nest, the Buzzard searches about for a stone, or what is more frequently found here a hard lump of calcined earth. Armed with this the Buzzard returns, and should the Emu be on the nest, alights on the ground some distance off, and approaches with outstretched flapping wings, and the Emu hastily abandons the nest and runs away. The Buzzard then takes quiet possession, and with the stone breaks a hole in the side of each egg, into which it inserts its claw and carries them off at leisure. I subsequently found portions of Emu egg shells in the nest of one of these Buzzards, and in a nest to which I recently ascended, which contained two young ones, I found amongst the remains of various reptiles the shells of a couple of Bustard's eggs. . . . I have never known the Buzzard to touch carrion, or feed upon anything it did not capture, and except at the nest I have never seen them perch on a tree, but have often observed them alight on the ground. Since the invasion of rabbits I have noticed that it is one of the greatest enemies of the rodent. In a nest in which there was a young one, I counted amongst the remains of various other animals the skulls of twenty-one rabbits, and in another nest examined, from which a young one flew off as I ascended the tree, I found a perfect hecatomb of animal remains, those of rabbits predominating. On passing this nest a few days afterwards I noticed there were two young ones in it. The young of this species, when soon after emerging from the shell, are clothed with pure white silky down, with the exception of a crescent-shaped mark beneath the eyes, which is black. The down resembles that on the young of *Nisœtus morphnoides*, and, similar to that bird, is longer on the head than elsewhere. . . . On the 20th March, 1890, I observed a pair feeding upon a rabbit, which they had apparently just killed. On the 11th September, 1890, I came across an Emu's nest containing some eggs, or rather egg shells, the whole having been broken into on their sides and the contents devoured. The stone with which the eggs were broken was in the nest among the egg shells. The Buzzard must have carried this stone a long distance, as such a thing could not be found anywhere in the vicinity. . . .' Later: 'Is now becoming rare in this district, where previously it was immensely abundant.

In former years examples could be seen on any day, and the nests were to be frequently found. Now months may elapse without a solitary individual being seen, while for a radius of fifty miles I do not know of an occupied nest. I am of opinion their decrease is due to increase of population in this part of the country, not that the birds have been destroyed, for they are exceedingly shy and wary and most difficult to shoot, but being so shy they evidently retreat from the presence of man; another cause is the rapid demolition of timber consequent upon increased population. Timber never was plentiful here, being chiefly in the shape of small clumps of a few acres in extent, dotted in long and irregular intervals (often miles between) over the plains. These clumps were the places in which their nests were constructed, and as a rule not more than two or three of the trees in any of the clumps were suitable for the construction of these huge nests, the generality of the trees being too small and the branches too weak to sustain the weight. As a natural consequence, the larger trees were the first to fall before the selector's axe, as affording the largest quantity of timber or firewood, and the birds had, therefore, another reason for betaking themselves to more secluded localities. The favourite resort of this species is undoubtedly open country, such as before mentioned, for, some fifty or sixty miles to the northward, heavily timbered country commences, extending for over one hundred miles, with thousands of trees suitable for the construction of their nests: yet it is only a passing straggler that is ever seen there, and I have never known or heard of an instance of their breeding in that locality.' "

Dr. Macgillivray's notes are also worth repeating: "*Gypoictinia melanosternon* is a rare bird here. During nearly nine years' residence, and a good deal of wandering through the scrubs and along the creeks of the district, I have only come across two pairs of these birds, and until 1909 had found only one nesting-place. My notes must necessarily deal mostly with one pair of birds. In 1907 Mr. McLellan and I, with some others, on our return journey from Langawirra, camped on Yalcowinna Creek, about thirty-five miles from Broken Hill. Early next morning, 9th September, we proceeded to investigate the nesting along the creek; cutting off a large bend to leave a portion near the camp, we struck the creek where a Cockatoo (*Cacatua sanguinea*), flying from a hole forty feet up in a tall Gum, attracted our attention to a large nest in the same tree, on which a bird was seen to be sitting. It was a very windy morning and the bird sat very closely; sticks and stones were thrown up, but she did not move until a shot was fired in the air from the specimen gun, when a magnificent female of the Black-breasted Buzzard left the nest, but kept soaring round and round at a respectful distance. Seen from below she was a splendid bird, both from her proportions and colouring, her black breast and ruddy under-surface and the dark primaries contrasting with the conspicuous white band across their bases, easily distinguish her from all other birds of prey. The male, who soon joined her, is only about half her size, and not nearly so conspicuously marked; he has none of her rich colouring, no black breast, and pinions not so dark, his breast seen through the glasses being fawn coloured. When soaring, which they both do, like the Wedge-tailed Eagle, with the carpal joint fully extended and primaries all spread out and separate, the male appears in colouring like a brightly-marked Little Eagle. The difference in size between male and female is, however, more marked even than in the Goshawks. When soaring round watching the climbers at work, the female kept uttering a series of short sharp cries in quick succession, much resembling the alarm note of the Wedge-tailed Eagle. . . . On the 11th September, 1909, we paid our third annual visit to this nest . . . we all remarked that the female seemed to be a different bird, not nearly so fine a one. Probably the old female had fallen a victim to poison, and the male had sought out another mate."

Mr. G. A. Keartland's notes read: "During the journey of the Horn Scientific Expedition in Central Australia in 1894, several examples of *Gypoictinia melanosternon* were seen soaring overhead at Darwent Creek, the white bases of the primaries showing strongly in contrast with their almost black breast, but no specimens were secured. I unsuccessfully tried to get near one which was busily engaged in devouring the remains of a wallaby, stopping only now and again to dispute the feast with a dingo, nor was our black boy more fortunate. Since our return, however, Mr. C. E. Cowle, of Illamurta, sent me a fine egg of this species. Again in North-western Australia the Black-breasted Kite was noted by the members of the Calvert Exploring Expedition in 1897. On Quanburn Station, Fitzroy River, I counted fifty-seven on the ground at one time. They do not frequent the trees like the other Accipitres, except when visiting their nest, but when full of food just stand on the ground like a stump, in which position they remain for hours. It is said they will not eat dead food, but I saw one feeding on a kangaroo I shot the previous day, and sometimes they fall victims to the poisoned carcasses prepared for wild dogs."

No less puzzling than the systematic position of this bird is its plumages.

In the *Nov. Zool.*, Vol. XVIII., p. 250, 1912, I named *Gypoictinia melanosterna decepta* from the Interior Northern Territory and North-west Australia, as all the breeding-birds I had seen from those localities lacked the characteristic black breast. Gould had written that "the sexes are alike in colouring, but present the usual difference in size, the male being the smallest." His description referred to the black-breasted bird.

However, North has explained (*Austr. Mus. Spec. Cat.*, No. 1, p. 244, issued October 31, 1911): "No one so far as I have observed has made any reference to the wide variation in colour of the adults of this species. Some specimens obtained in the same district are as different in colour as the light and dark varieties of the Wedge-tailed Eagle (*Uroaëtus audax*), only in this instance age has apparently nothing to do with this distinction. Of two adult females now before me, both shot at the nest by the late Mr. K. H. Bennett, respectively in October and November in the Central District of New South Wales, the former agrees very well with the above description (of a black-breasted male), but the latter varies in the following respects. All the feathers on the upper parts are margined with rufous, the inner series of the upper wing-coverts are pale tawny fulvous, as are also the feathers on the head and nape, their bases whitish, those on the fore-head and hind neck only having blackish central streaks: all the under-surface creamy fulvous washed with rufous, except on the flanks and thighs, most of the feathers on the foreneck and upper breast having blackish-brown central streaks, and several of those on the middle of the lower breast broadly centred with brown near the shaft of the inner web only. The abraded quills and tail-feathers, and being shot while nesting, conclusively prove that this difference in colour is not the result of immaturity. Wing 18.2 inches. An adult male procured in Western Australia is just the reverse, being blackish above and below, with scarcely a trace of rufous on the feathers of the upper parts, the upper wing-coverts and the nape and hind-neck being brown, some of the feathers having darker centres and whitish edges. Wing 18 inches."

Dr. Macgillivray, as quoted above, gives his experience as the female being black breasted and very much larger than the male, which did not have the black breast.

The pairs in my collection, as recorded above, are almost exactly the same size and the same colour.

I have concluded that only senile birds achieve the black breast, and in view of the disparity in size owing to sex and age, I at the present time cannot consider any subspecies of this species valid.

As previously noted, the systematic position of the bird is quite uncertain; however, owing to its peculiarities, I feel quite confident that it must have arrived in Australia with the first migration from the North. Kaup separated this bird as a subgenus of *Milvus*, noting: "Bill twice as long as high: tarsus, upper-half transverse scales, lower half fine little scales: tail not forked." I am not certain that when this was written Kaup had examined a specimen, but think he made up this diagnosis from an examination of Gould's figure.

Kaup's classification was endorsed by Sharpe, who wrote in the *Proc. Zool. Soc.* (Lond.) 1875, p. 339: "It will be seen from the tarsus, with its scaled hinder aspect and its long wings, that the bird is a Kite and not a Buzzard at all."

I am quite unable to understand this statement, as the specimen under consideration by Sharpe is in the British Museum still, and the hinder aspect of the tarsus is quite regularly covered with reticulate scales, as is the case with all the Buzzards as well as the Kites: neither have "scaled" hinder aspect of the tarsi, as I understand the word "scaled," otherwise every Falconiform bird has the hinder aspect "scaled" if by that word is meant either hexagonal or transverse scales.

I do not mean to state that Sharpe was *absolutely* wrong in considering this bird a Kite relation, but it is not yet proven.

GENUS—ELANUS.

ELANUS Savigny, Descr. Egypt Hist. Nat., Vol. I.,
p. 69, 1809 .. .. Type *E. cæruleus.*

SMALL Aquiline birds with short bills, long wings, long tails, and short almost feathered legs and small feet.

The bill is short and sharply pointed with a large cere; the nostrils are circular, and the bristles of the lores extend over but do not completely cover them; the lower edges of the upper-mandible are sinuated but only slightly. The wing is long *with the first primary long,* only slightly shorter than the third and not much exceeded by the second which is longest. This wing formation is unique in the family Aquilidæ, as far as Australian birds are concerned.

The tail is long and square and about half the length of the wing.

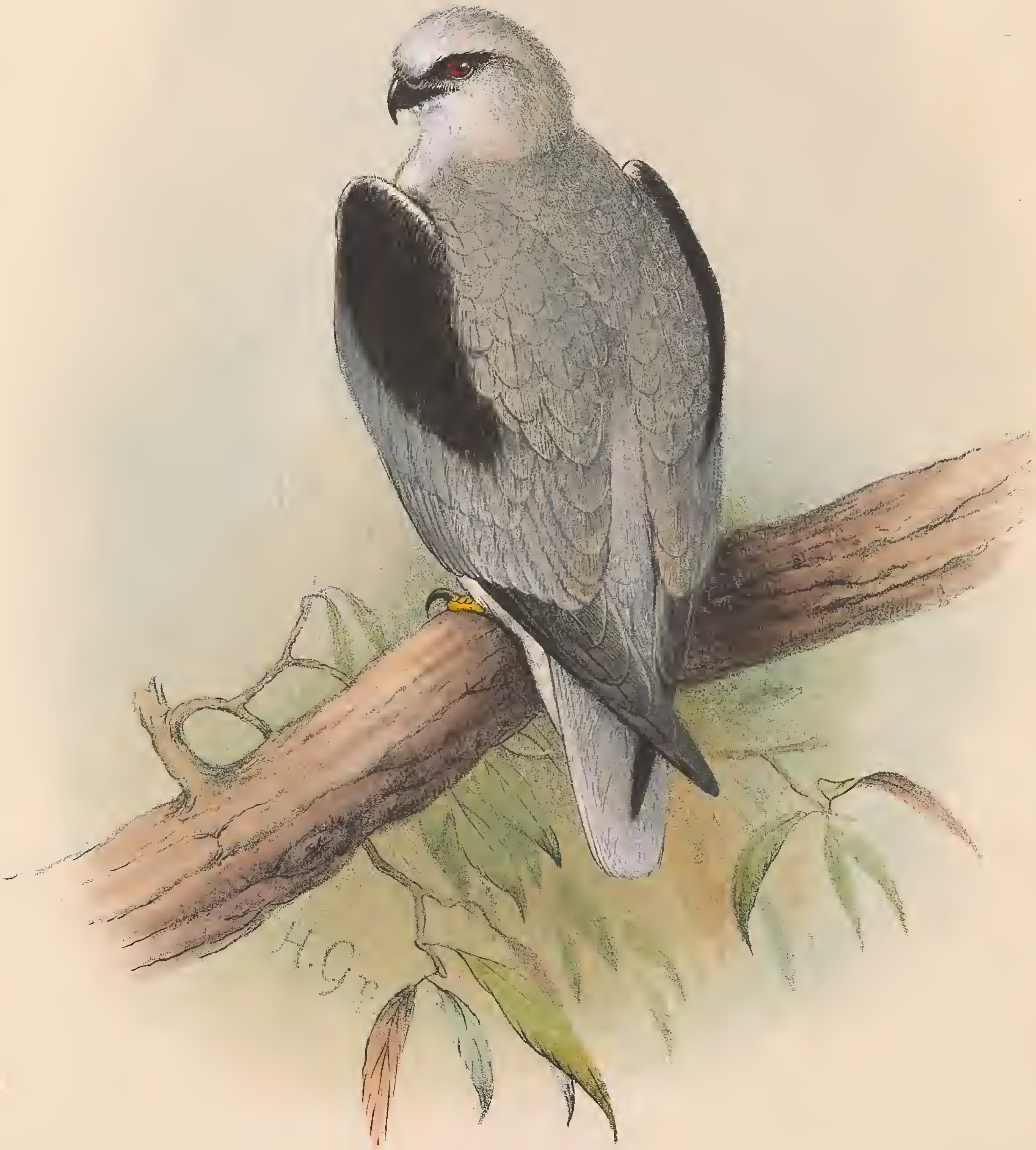
The feet are short and stout, feathered on the front two-thirds of their length but naked behind: the scaling consists entirely of reticulate scales. The toes are short.

Superficially the birds of this genus are recognisable at sight by their coloration and size, but structurally the wing-formation just as definitely determines them, while osteologically they are just as distinctly marked. Thus, from the most casual observation, they correlate well with no other Aquiline bird, and osteological examination shows peculiarities also well marked.

Key to the Species.

A. Axillaries white; inner webs of primaries dark .. *E. notatus*, p. 199.

B. Axillaries black; inner webs of primaries light .. *E. scriptus*, p. 208.



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ELANUS AXILLARIS.

(BLACK SHOULDERED KITE).

No. 306.

ELANUS NOTATUS.

BLACK-SHOULDERED KITE.

(Plate 249).*

Elanus notatus Gould, Synops. Birds Austr., pt. iv., App., p. 1, Apl. 1838 : New South Wales.

Elanus melanopterus (not Daudin) Vigors & Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 185, 1827 (N.S.W.).

Elanus notatus Gould, Synops. Birds Austr., pt. iv., App., p. 1, 1838 ; *id.*, Proc. Zool. Soc. (Lond.) 1837, p. 141, Dec. 1838 ; Witmer Stone, Austral Av. Rec., Vol. I., p. 146, 1913.

Elanus axillaris Gray, Ann. Mag. Nat. Hist., Vol. XI., p. 189, 1843 ; Gould, Birds Austr., Vol. I., pl. 23, 1848 ; *id.*, Handb. Birds Austr., Vol. I., p. 53, 1865 ; Diggles, Ornith Austr., pt. iii., 1866 (Q.) ; Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 338, 1874 ; Ramsay, Proc. Zool. Soc. (Lond.) 1875, p. 579 (Q.) ; *id.*, Cat. Austr. Accip., p. 41, 1876 ; *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 177, 1878 ; Gurney, Ibis 1879, p. 333 ; *id.*, List Diurn. Birds Prey, p. 84, 1884 ; Ramsay, Tab. List Austr. Birds, p. 1, 1888 ; North, Austr. Mus. Cat., no. 12, p. 14, 1890 ; *id.*, *ib.*, no. 4, p. 45, 1898 ; Hall, Key Birds Austr., p. 2, 1899 ; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 27, 1901 ; Hartert, Nov. Zool., Vol. XII., p. 208, 1905 (N.W.A.) ; Batey, Emu, Vol. VII., p. 3, 1907 (Vict.) ; Mathews, Handl. Birds Austral., p. 41, 1908 ; Howe, Emu, Vol. VIII., p. 136, 1909 (Vict.) ; Batey, *ib.*, Vol. IX., p. 241, 1910 (Vict.) ; Mathews, *ib.*, p. 239, 1910 (N.W.A.) ; *id.*, *ib.*, Vol. X., p. 108, 1910 (N.W.A.) ; North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 249, 1912 ; Hill, Emu, Vol. XII., p. 255, 1913 (N.T.) ; Mathews, List Birds Austr., p. 109, 1913 ; Macgillivray, Emu, Vol. XIII., p. 151, 1914 (N.Q.) ; Barnard, *ib.*, Vol. XIV., p. 42, 1914 (N.T.) ; S. A. White, Trans. Roy. Soc. S.A., Vol. XXXVIII., p. 425, 1914 (Central).

Elanus axillaris axillaris Mathews, Nov. Zool., Vol. XVIII., p. 250, 1912 ; *id.*, List Birds Austr., p. 109, 1913.

Elanus axillaris parryi Mathews, Nov. Zool., Vol. XVIII., p. 251, 1912 ; Parry's Creek, North-west Australia ; *id.*, List Birds Austr., p. 109, 1913.

Distribution. Australia (*not* Tasmania).

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* The Plate is lettered *Elanus axillaris.*

Adult male. Hinder crown, nape, hind-neck, back, scapulars, innermost secondaries, outer aspect of wings and tail ash-grey; primary-quills darker than the back with black shaft-lines to the feathers, secondaries paler and inclining to white on the inner webs; tail-feathers paler than the back with dark shaft-lines and inclining to white on the lateral feathers; upper wing-coverts and a small patch on the outer portion of the wings black; fore part of head, throat and entire under-surface white, including the axillaries; a spot in front and a narrow line over the eye black; median under wing-coverts black; greater series and quill-lining dark grey; outer margin of wing white. Iris red; tarsi and feet yellow; bill black, cere olive-grey. Total length 370 mm.; culmen 18, wing 284, tail 142, tarsus 36. Figured. Collected on Parry's Creek, North-west Australia, on the 27th of January, 1909, by Mr. J. P. Rogers.

Adult female. Similar to the adult male, but larger. Wing 308 mm., culmen 18, tarsus 39. Collected at Cooktown, North Queensland, on the 22nd of July, 1900.

Immature. Have the primaries and secondaries and their coverts tipped with white, the black feathers of the wing, especially on the bend, tipped with white, some of them showing a rusty colour; the feathers of the back have wide rusty margins; top of head dark rusty-red with dark shaft-lines; fore-head white with dark centres to the feathers; upper-breast white, the feathers more or less tipped with rusty.

An older bird has lost much of the rusty colour, the adult plumage taking its place.

Nest. Composed of sticks and lined with leaves. Outside measurements 12 to 14 inches by 6 deep. Inside 6 in. by 3 in. deep.

Eggs. Clutch, three. Whitish, covered with big blotches of reddish-brown, but the markings are sometimes all at one end, at others almost all over the egg. Axis 38-43 mm.; diameter 30-32.

Breeding-season. June to November.

In the Suppl. II. to the *General Synopsis of Birds* there was described in English a bird under the name of Axillary Falcon.

In the *Suppl. Index Ornith.* 1801, p. ix., Latham introduced: "F(alco) axillaris. F. corpore cærulescente subtus albo, superciliis & axillaribus nigris. Axillary Falcon, *Gen. Syn. Sup. II.*, p. 42, No. 46. Habitat in *Nova Hollandia*, magnitudine and habitu *F. Cyanei*: *rostrum* nigram: *irides* fusci: *pedes* flavi."

It is obvious that previous writers have not read this description, as the words "*axillaribus nigris*" are very noticeable.

The English description of the "Axillary F(alcon)" (p. 42), reads: "Size and shape of the *Hen-harrier*, and not unlike it in colour, but differs essentially, as the wreathed feathers round the lower part of the head are not conspicuous; the bill is black; legs pale yellow; claws black; the plumage on the upper parts is pale cinereous blue: the under whitish; over the eye a long irregular narrow stripe of black; a large long patch of black also occupies the whole of the inner part of the wing when closed; the quills are black and reach to the end of the tail, which is rather rounded in shape and of a moderate length.

"Inhabits *New Holland*, but it is not very common. The specimen from which the above description was taken was caught alive, and kept for two months, being fed with small birds, fish, etc."

This bird appears to have been unrecognised until 1843 when G. R. Gray, from examination of the Lambert Drawings, revived it for the bird determined by Vigors and Horsfield as *Elanus melanopterus*, but afterwards described by Gould as *Elanus notatus*. Almost simultaneously Gould described a very similar bird as *Elanus scriptus*. In his "Birds of Australia" Gould accepted Gray's determination, figuring the two birds as *Elanus axillaris* and *Elanus notatus*. Gould wrote: "On reference to the synonymy given above, it will be seen that neither Mr. Vigors nor myself had sufficiently studied the Australian Raptorial Birds described by the venerable Latham to be aware that he had assigned the specific designation of *axillaris* to this Kite: the terms *melanopterus* of Vigors, and *notatus* of myself, must therefore be reduced to synonyms."

This usage gained acceptance without criticism.

In the *Hist. Coll. Nat. Hist. Brit. Mus.*, Vol. II., 1906, Sharpe gave a long account of the Watling Drawings, and on p. 109 wrote:

"4. Painting of an *Elanus*, with the following note by the artist: 'Natural size. The head of this drawing is rather too large and long, the bill should be smaller, and more rounded in towards the breast. I had the bird alive three months, and fed it on small birds and fish, etc.'

"Nos. 5, 6. Two more paintings of an *Elanus*, one-half and one-third natural size. Native name *Geo-ga-rack*. Latham founds on this description his Axillary Falcon (*Suppl.* II. *Gen. Synopsis*, p. 42). He says that it 'inhabits New Holland, but is not very common. The specimen from which the above description was taken, was caught alive, and kept for ten (*sic*) months, being fed with small birds, fish, etc.' This note is taken from Watling's MSS., but is not acknowledged. This picture becomes the type of Latham's Axillary Falcon (=*Falco axillaris* Lath., *Ind. Orn. Suppl.*, p. ix.).

"7. Represents an *Elanus*, which Latham in his MS. list places as a variety of his Axillary Falcon, which is probably the case."

No complication would have ensued had there been only one species of *Elanus* in Australia, but there are two, and the question arises: "How did Latham get the name Axillary?" In the Latin description, as I have pointed out, is written "axillaribus nigris": in the English no mention is made of axillaries, but the name Axillary Falcon is used, while we read: "A large long patch of black also occupies the whole of the inner part of the wing when closed."

The species known under the name "*axillaris*" has *white* axillaries, while the species known as "*scriptus*" has *black* axillaries. If the name be utilised at all, "*axillaris*" should replace "*scriptus*," but in view of the lack of mention of axillaries in the English description, I prefer to consider the name *axillaris* as indeterminable. This conclusion is confirmed by study of the Watling Drawings, as none show the differential features of the two species. Moreover, both species are of rare occurrence round about Sydney, and there can be no doubt that from the figures the bird kept in captivity could have belonged to either species.

Gould apologised for not studying Latham's description before describing *notatus*, but apparently he simply took Gray's conclusion without confirmation. Otherwise he would have noted the distinguishing character. When Gray made his recognition, the second species of *Elanus* had not been described: this accounts for the primary blunder. Under the circumstances, *axillaris* cannot be retained for the white axillaried bird, and as we have two certain names, it seems much the best to decide it to be accurately indeterminable. In this place, rather than provide further problems, I am retaining *scriptus* for the black axillaried bird and reviving *notatus* of Gould for the bird without black axillaries.

Captain S. A. White has written me: "The Black-shouldered Kite is not an uncommon bird in South Australia and at certain times of the year they come south in pairs. Insects and reptiles seem to be their principal food, and I feel quite sure they will not build a nest if they can possibly help it, but make use of any stick nest that may suit them, such as of a Crow or Magpie."

Mr. Thos. P. Austin, writing from Cobbora, New South Wales, under date February 11, 1915, states: "It is very seldom that I ever see this species in this district, and I have never known them to breed here. One spring about 26 years ago they appeared in the district of Geelong, Victoria, in almost thousands; wherever I went these birds were to be seen perched in trees, on fences, and on telegraph posts and wires: they even came almost into the town. As far as I know none of them bred there."

Mr. Tom Carter wrote: "The Black-shouldered Kite was an irregular visitor to the Mid-west. Sometimes several years would pass without any being seen. In the drought of 1890-91, a good many were seen on the coast at Point Cloates and several were found dead in a very emaciated state. Considerable numbers used to congregate every night to roost on a few stunted trees that stood near the house close to the beach. Their next appearance was in the wet season of 1900, when they were fairly common both inland and on the coast, but were very wary and hard to shoot. A pair of them reared a brood of young in a tall wattle bush at Point Cloates: the nest was about 8 feet from the ground, and the ground below was littered with ejected pellets by the birds. These pellets were largely composed of bones of mice."

Gould's notes are worth reproducing as relating to a time when New South Wales, etc., was less settled than now and consequently bird-life was more natural and observations more easily taken. "The *Elanus axillaris* is a summer visitant to the southern portions of the Australian continent, over which it is very widely but thinly dispersed, being found at Swan River on the west coast, at Moreton Bay on the east, and over all the intervening country. In its disposition it is much less courageous than the other members of the Australian *Falconidæ*, and, as its feeble bill and legs would indicate, lives more on insects and reptiles than on birds or quadrupeds. I very often observed it flying above the tops of the highest trees, and where it appeared to be hawking about for insects; it was also seen perched upon the dead and leafless branches of the *Eucalypti*, particularly such as were isolated from the other trees of the forest, whence it could survey all around."

Batey (*Emu*, Vol. VII., p. 3, 1907) noted: "One season in Newham Shire (Victoria) some of these Kites appeared, and their identity was proved. They and the previous species (*E. scriptus*) seemed to be out of bounds thereabouts."

Later, writing of birds about Drouin, Gippsland, Batey added (*Emu*, Vol. IX., p. 241, 1910): "Once some appeared and were quite new to residents in my vicinage."

Ramsay wrote: "During the last six years several pairs of these Hawks have been known to breed on the Jindah Estate, on the Mary River, in Queensland, but it was only in November last (1877) that a pair gave my brother (Mr. John Ramsay) an opportunity of taking their nest and eggs. The nest in question was placed among the topmost forked branches of a *Flindersia*, and, as usual, composed of sticks and twigs; it was, however, a bulky structure, as is often the case with Australian Hawks' nests. The eggs were three in number, but my brother assures me that four is the correct number for a sitting."

Campbell (*Nests and Eggs Austr. Birds*, Vol. I., p. 27, 1901) wrote: "The last specimens I happened to observe in Victoria were a beautiful pair which were hawking over the rich alluvial flats of Bacchus Marsh, 28 March, 1899."

Mr. S. W. Jackson's notes continue: "Black-shouldered Kites arrived here (South Grafton, New South Wales) in great numbers in May (1897), and it was quite a common occurrence to notice a pair of birds on almost every farm field on the river. On the other hand, what appeared to be the Letter-winged species was rarer, as I only noticed about seven or eight pairs to the many dozen pairs of Black-shouldered Kites. However, both species have now (September 10th) become still less, and I fancy many of them have left the district. During my residence here, a period of six years, I never noticed these Kites in such numbers, and I always looked upon them previously as birds of great rarity, as in former seasons I only noticed two or three pairs of the Black-shouldered variety on the river, and it is four years since I saw a Letter-winged Kite about the district: therefore I have come to the conclusion that the birds have been driven to the rivers owing to the drought prevailing in the interior portions of the State. They obtain all their food from off the ground, and do not feed on grubs etc. off the tops of eucalyptus trees as the Crested Hawk and others usually do."

From North's account in the *Austr. Mus. Spec. Cat.*, No. 1, I quote the following: "Mr. Hislop's note . . . The Black-shouldered Kite is only found in the forest land, and is generally seen in pairs. I think they breed in the Bloomfield River District (North-eastern Queensland) as they are about there nearly all the year round, but I have never found any of their nests. The birds are generally seen on plains where there are very few trees. They live on mice, lizards, and also grasshoppers and other large insects. The native name for them is '*Calin calin.*'" Mr. George Savidge observed: "The Black-shouldered Kite (*Elanus axillaris*) is, in some seasons, fairly plentiful in the Clarence River District. I have observed it, too, nearer the coast at Maclean: also the flat lands about Ulmarra and Grafton, and on the flats at the foot of the Cangai Ranges, about forty miles further inland from here. It appears about Copmanhurst in May, and usually lays in June or July and leaves again after the young are reared. Three or four eggs are generally laid for a sitting, the nest usually being placed in a thick, bushy part of some tall tree. Both birds carry sticks to the nest: they take hold of the piece of twig they want by either claws or beak, let their weight fall on it to break it off, and fly away to their nest with it; they can build a nest quickly and soon have it completed. Large numbers of this very useful bird are shot annually. They feed principally upon mice, lizards and grasshoppers." Again, writing in 1897 from South Grafton, Savidge confirms Jackson's account: "I have seen them here in previous years, but never so plentiful since 1893. . . . The birds are fearless of man, building close to settlers' houses. . . . I saw a pair hovering over a maize field, descending now and again catching mice; when a bird caught one it would fly with it to the dead limb of a tree, when it was quickly torn to pieces and devoured."

BLACK-SHOULDERED KITE.

The genus *Elanus* is a peculiar one, from whatever point of view it is studied. Five forms are recognised occurring all over the world, two of which are confined to Australia. This is very suggestive, but the results of examination of the whole of the forms are not conclusive. Thus, if they are laid out, we see:

E. cæruleus Desfontaines ..	Africa, S.E. Europe, Asia to India and Ceylon.
E. hypoleucus Gould ..	Java, Borneo, Celebes, Philippines.
E. scriptus Gould ..	Australia.
E. notatus Gould ..	Australia.
E. leucurus Vieillot ..	Southern North America and South America.

All show the same upper coloration, varying in shade only, having the same greyish to white tails and the same black shoulder-patch more or less extensive. When laid on the backs, all are white underneath, but show slight differences if the inside of the wing be looked at. Then:

E. cæruleus has pure white inner wing-coverts, the inner webs of the primaries black.

E. hypoleucus has pure white inner wing-coverts, the inner webs of the primaries white.

E. scriptus has a black patch along the median inner wing-coverts, the axillaries also black and the inner webs of the primaries greyish-white.

E. notatus has the black patch less extensive, the axillaries white, and the inner webs of the primaries black.

E. leucurus agrees with *E. notatus*, but is slightly larger and darker.

In almost any other genus such differences would only be considered of subspecific value, but the distribution shows we are here dealing with a very ancient form and that the slight differences must be considered as of specific value. This is confirmed by the fact that two forms live together in Australia, and these two forms are very close indeed. Thus the South American species is almost indistinguishable from the commonest Australian one, though the species occurring geographically nearest Australia is most distinct from either of the Australian ones.

After making the above examination and notes I referred to Gurney and found in the *Ibis*, 1879, pp. 331-336, a long detailed discussion of these birds from which I extract the following notes: "Mr. Sharpe, very properly as it seems to me, does not admit *E. minor* of Bonaparte as specifically, or even subspecifically distinct from *E. cæruleus,* and though variations of size occur in this species, they do not seem to be of a very marked character; the length of the black patch on the wing-coverts also varies in different specimens, and more considerably so than the general dimensions. . . . *E. hypoleucus,* though nearly allied to *E. cæruleus,* is certainly distinct, at least subspecifically, has an oceanic range, which is particularized in Mr. Sharpe's volume, and which is geographically intermediate between the eastern limit of *E. cæruleus* and the most northerly appearance of *E. axillaris.* Mr. Sharpe gives the habitat of the last-named species as Australia only, but according to Mr. Gould, it occurs as far northwards as Java, where, however, it appears to be much scarcer than *E. hypoleucus*; and, in confirmation of Mr. Gould's assertion, I may mention that the Norwich Museum possess a nearly adult specimen which was brought to this country by the celebrated traveller Madame Pfeiffer, who obtained it (as I was informed at the time) during her visit to the island of Java. In this specimen the measurements of the wing, tail and external black wing patch slightly exceed those of any Australian example which I have examined, and the grey on the back is somewhat darker than is usual in Australian specimens, with which, however, it appears to agree in all other respects. The two Australian *Elani* (*E. axillaris* and *E. scriptus*) are both remarkable for the great paleness of the grey tints of the upper-surface, and this circumstance appears to me to constitute the most marked and constant distinction between *E. axillaris* and the American *E. leucurus,* which (as the later described species) should be considered a subspecies of *E. axillaris.*"

It is probable that Dr. Hartert, dealing with Palæarctic birds, may have recognised subspecies of *E. cæruleus,* but this part, if issued, is not available to me. Upon carefully considering the matter with the antiquity of the genus *Elanus* fully admitted, I still maintain that the small, apparently minute, distinctions seen in this genus must be regarded as of specific rank. I have observed the variation in size and colour and therefore at the present time dismiss *E. a. parryi* as a validly recognisable subspecies. Were longer series available it might be upheld, but I observe great difference in coloration between specimens obtained at the same place and also note South American examples, as quoted by Gurney and Ridgway, sometimes very closely approximate to Australian.

It may be that *E. scriptus* is slightly larger than *E. notatus,* but the measurements are very close. The evolution of these two forms is problematical. I cannot account for the production of the black patch on the inner wing-coverts in any satisfactory manner. All the theories are upset by the fact that both species possess it. If we suppose that the one with the most black is more an interior bird as records suggest, we cannot account for its loss in the coastal regions, as the reverse is the usual procedure. Yet *E. hypoleucus,* the Islands breeding bird, has the whitest inside of the wing. Both the Australian species seem to be more or less desert-loving birds, and the one most regarded in that character has the most black under the wing of any form. Nevertheless, I cannot see that we can regard these in any other way than immigrants from the North and, moreover, I would allot *E. scriptus* to the first and *E. notatus* to the second migration suggested in connection with these birds.

No. 307.

ELANUS SCRIPTUS.

LETTER-WINGED KITE.

(PLATE 250.)

ELANUS SCRIPTUS Gould, Proc. Zool. Soc. (Lond.) 1842, p. 80; South Australia.

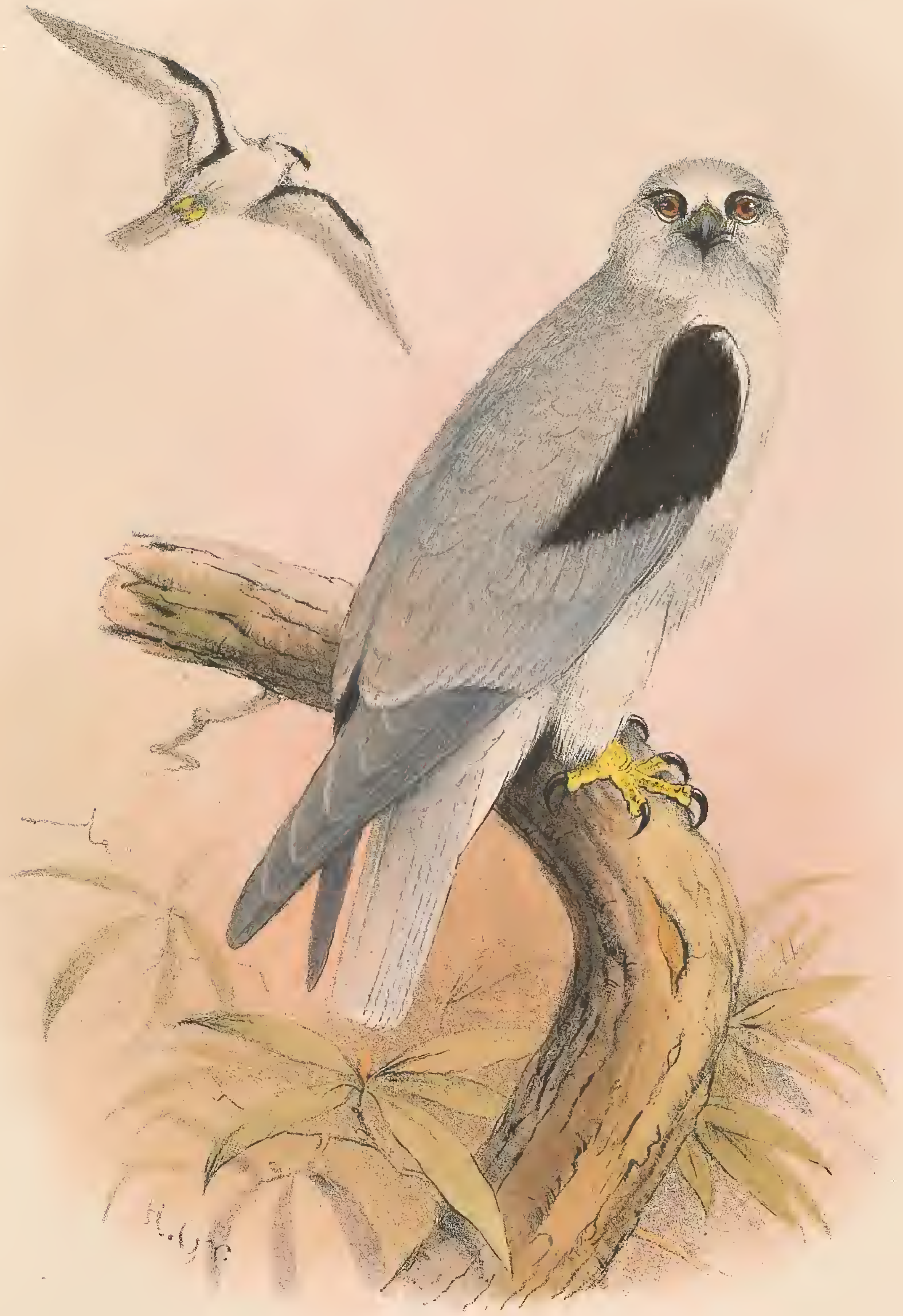
Elanus scriptus Gould, Proc. Zool. Soc. (Lond.) 1842, p. 80; *id.*, Birds Austr., Vol. I., pl. 24, 1848; Sturt, Exped. Centr. Austr., Vol. II., App., p. 15, 1849 (Central); Gould, Handb. Birds Austr., Vol. I., p. 55, 1865; Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 340, 1874; Ramsay, Cat. Austr. Accip., p. 43, 1876; *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 177, 1878; Gurney, Ibis 1879, p. 334; *id.*, List Diurn. Birds Prey, p. 84, 1884; Broadbent, Proc. Roy. Soc. Queensland, Vol. III., p. 25, 1887 (Q.); Ramsay, Tab. List Austr. Birds, p. 1, 1888; North, Austr. Mus. Cat., no. 12, p. 15, 1890; *id.*, *ib.*, no. 4, p. 47, 1898; Hall, Key Birds Austr., p. 2, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 28, 1901; Hall, Key Birds Austr., 2nd Ed., p. 2, 1906; Batey, Emu, Vol. VII., p. 3, 1907 (Vict.); Mathews, Handl. Birds Austral., p. 42, 1908; Stone, Emu, Vol. XII., p. 113, 1912 (Vict.); North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 253, 1912; Mathews, Nov. Zool., Vol. XVIII., p. 251, 1912; *id.*, List Birds Austr., p. 109, 1913; Witmer Stone, Austral Av. Rec., Vol. I., p. 146, 1913.

DISTRIBUTION. South Queensland; New South Wales; Victoria; South Australia.

Adult male. Upper-surface for the most part pale grey, paler and inclining to white on the head, hind-neck, lower back, and outer tail-feathers; upper wing-coverts, axillaries and under wing-coverts black; outer edge of wing white; inner webs of the primary-quills mottled with white, the white increasing in extent on the inner webs of the secondaries; a spot in front of the eye black, which is extended in a narrow line above the eye as well as a narrow ring encircling the latter; throat and under-surface white. Bill black; cere yellow; feet yellow; iris orange. Total length 370 mm.; culmen 18, wing 275, tail 144, tarsus 33. Figured. Collected in Victoria in December, 1902.

Adult female. Similar to the adult male, but larger. Wing 312 mm., culmen 20, tarsus 38. Collected at Wollongong, New South Wales, June 1893.

Immature. "Above ashy-brown, the tips of all the feathers more or less margined with white, except those on back of the neck and interscapular region. Those parts of the wing black in the adult are of a blackish-brown, margined with white near the primaries and on the shoulders." (North.)



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ELANUS SCRIPTUS.

(LETTER-WINGED KITE).

Nest. Composed of sticks and lined with leaves. Very similar to the former species.

Eggs. Clutch, three to four. Bluish-white, sparsely blotched with brown, sometimes only at one end. Axis 45-48 mm.; diameter 35-36.

Breeding-season. August to November.

Captain S. A. White observes: "*Elanus scriptus* is a much rarer bird in South Australia than the Black-shouldered variety and they seem to keep more to the interior. It is also more wary and flies with more rapidity, as far as my observations have taken me; their food chiefly consists of small reptiles, grasshoppers and other insects."

Batey (*Emu*, Vol. VII., p. 3, 1907) has written: "About 1888 I saw a bird of this species at Toolern (Melton Shire, Victoria) and three near Mt. Macedon. One of the latter was shot, and its identity established. It would appear to be the rarest of the Hawk tribe in above region."

Gould noted: "It is a denizen of the interior of the country, Captain Sturt having obtained it at the Depôt, and Mr. White, of the Reedbeds, South Australia, informing me that he found this species "in great numbers on Cooper's Creek, between 27° and 28°, always in companies of from ten to twenty or thirty in number. It flies when near the ground with a heavy flapping motion, but occasionally soars very high, when its movements are very graceful. It is rather inquisitive, but not so bold as *Milvus affinis*. It nests in companies as near each other as possible."

It does not, however, appear to have been commonly observed by other expeditions into the interior, and it is possible that Mr. White met with a local irruption such as is described by Mr. Syd Jackson in relation with the previous species, where he mentions that this bird appeared with it but in much less numbers. Hill, Captain White and others simply observe that they saw solitary birds which they assigned to the previous species, but if seen from behind might just as well be this one. They did not meet with either in any numbers, and undoubtedly both are rare birds, this one apparently being much more uncommon and more confined to the interior.

Not much has been written concerning this bird, and North in the *Austr. Mus. Spec. Cat.*, No. 1, only gives a couple of notes, which I here transcribe.

Mr. K. H. Bennett's observations read: "*Elanus scriptus* can only be considered an occasional visitant in this locality (Mossgiel, New South Wales). In 1864, when this part of the country was first occupied, it was infested for some months by at least two species of rats, and preying upon them were large numbers of the Letter-winged Kite. Suddenly the rodents disappeared, and with them the Kites. Only one occasion since (in 1870) have these birds appeared in any numbers, and at that time the country was invaded with legions of mice. Since then only a few pairs have visited the district and remained only a short time, the last I saw being in 1882. I have never known an instance of their breeding here." Mr. G. A. Keartland added: "During the journey of the Horn Scientific Expedition in Central Australia in 1894, the Letter-winged Kite was met with in pairs near McMinn's Ridge, and were very numerous at times. They were generally seen flying over the coarse grass and saltbush, searching for rats and mice, lizards and grasshoppers, which abound in the sandhills."

Keartland's experience confirms Mr. White's as quoted by Gould, but the status of this species is unsatisfactorily known. It may be very rare or common in the interior, but all the facts point to the former.

Most of its history has been detailed under the previous species, but it seems unlikely to have any well-marked peculiarities of its own as regards habits. If such were ascertained, they would become valuable assets in the consideration of the relationship of these two species.

GENUS—LOPHASTUR.

LOPHASTUR Blyth, Journ. As. Soc. Bengal, Vol. XI., p. 463, 1842 .. .. Type *L. jerdoni.*

SMALL birds, probably of Aquiline affinity, with double-toothed sharply-hooked bills, occipital crest, long wings, long tail and short legs and feet.

From all other Australian Falconiform birds, this genus is marked off by the bill and crest.

The genus-name hitherto in use has been *Baza*, and it is only after very careful consideration that it has been rejected. As a supergeneric name *Baza* might be used, but it is even probable that the group known as *Baza* would be entitled to subfamily rank when the osteology is carefully studied.

In the *Cat. Birds*, Vol. I., 1874, Sharpe included *Baza* in the Falconidæ, but from this course Gurney dissented, writing in the *Ibis*, 1880, p. 462, as follows:

"Mr. Sharpe has united the genera *Baza* and *Avicida* under the former title, and it seems to me that the distinction between these two genera is sufficiently slight to make their fusion permissible, though it should be mentioned that Mr. Ridgway has expressed a contrary opinion in his 'Studies of Falconidæ,' p. 153; but, agreeing in this respect with Mr. Sharpe, I differ from the course which he has adopted in including the genus *Baza* amongst his 'subfamily Falconidæ.' In common with several previous writers, I look upon *Baza* as belonging to the group *Pernes*, and as constituting the concluding genus of the very extensive Milvine subfamily to which this group is, in my view, attached. In connexion with this subject I may quote the following remarks on the osteology of *Baza madagascariensis* from the important work of MM. Milne-Edwards and Grandidier on the 'Birds of Madagascar,' Vol. I., p. 75: 'Cette étude détaillée des caractères ostéologiques du *Baza madagascariensis* montre que cet oiseau diffère trop complètement des Faucons pour pouvoir prendre place dans la même famille, qu'il ressemble bien plus aux Milans et aux Bondrées, et que si la forme de sa tête osseuse et de son appareil sternal n'était pas toute spéciale, on pourrait le considérer comme au genre *Pernis.*'

"The genus *Baza* seems to me to assort itself into four natural subdivisions: the first consisting of *B. cuculoides* and *B. verreauxi*; the second of

B. madagascariensis; the third of *B. subcristata, B. reinwardti, B. rufa, B. erythrothorax, B. magnirostris, B. ceylonensis,* and *B. sumatrensis*; the fourth of *B. lophotes,* which, it may be mentioned, is the type of the genus.

"It may be observed that the first of these subdivisions comprises the two African species, the second that which is limited to Madagascar, the third the Australian and Oceanic races, whilst the fourth consists of a species inhabiting India and the Malay countries."

I have quoted this in full, as my own examination gave conclusions practically identical with those put forward by Gurney, though independently undertaken and carried out as hereafter shown.

In the *Proc. Zool. Soc.* (Lond.), 1902, p. 315, Pycraft accepts Suschkin's classification of this genus, writing:

"In the (subfamily) Perninæ (family Buteonidæ): *Pernis, Baza, Elanoides, Leptodon* and *Pandion.* But from views he expressed in conversation, he would, I suspect, probably make a separate subfamily for *Pandion—Pandioninæ.*"

My criticism of the species allotted to the genus *Baza* by Sharpe has proved of interest, and I confidently anticipate osteological examination will confirm my subdivision of this into the four natural divisions indicated by Gurney.

The type of *Baza, leuphotes* Dumont (=*lophotes* Temminck) is at sight differentiated by its small size and striking coloration from the Australian *subcristata.* It was necessary then to investigate its exact relationship, and, judging from plumage-changes, it is the most highly specialized form.

As above stated, it is possible we have here a SUPERGENUS, but the development of *Baza* indicates a higher rank.

Thus, on the mainland of Africa, two species occur: the juvenile stage has the upper plumage almost uniform brown, the under white with longitudinal brown spots such as is seen in the immature of *Urospiza fasciata*; this is succeeded in one species by the head becoming bluish-grey, the back greyish-brown, the throat grey, and breast to vent whitish, transversely barred with reddish brown bars: the second species passes through the same plumages, but in the senile state becomes blackish-grey above and the breast bars become obsolete, while they entirely disappear from the abdomen, leaving the breast to vent almost uniform.

These constitute the genus *Aviceda* Swainson. In Madagascar a form occurs which retains the upper brown plumage, but underneath the throat continues the longitudinal spotting, and the rest of the under-surface is almost uniform through the bars broadening and overlapping. I have not seen a very young bird, but it may be similar to that of *Aviceda.* However, through isolation, the wing formula has varied and the bird is slightly larger with a heavier bill, longer wing, longer tail, and stronger feet. In the wing the first primary is less than the seventh, the fifth longest, the fourth slightly shorter but longer than the third, which is longer than the second: this is about equal to the sixth, both considerably longer than the first.

I propose to name this form NESOBAZA gen. nov., type *Nesobaza madagascariensis* (Smith). It appears to be a product of isolation from the African branch, in which the immature plumage is retained to a greater extent than in *Aviceda.*

Baza, which should be restricted to the type *B. leuphotes* Dumont, is superficially quite unlike the preceding in coloration and form. It is blackish-blue above, with white or reddish-white spots on the wings: the throat is black, while the breast is represented by a broad white band, followed by a narrow black band succeeded by brown bars. In the immature these bars extend to the vent, but in the senile form only a few immediately following the black band remain. That is, the bird has now arrived at a plumage more advanced than *Aviceda,* and has discarded the various plumages pursued during this development, taking on this very beautiful evolution in its first plumage. Phylogenetically, *Baza* is the most specialised form, and judged from colour alone it demands generic separation from the others.

A dictum worth consideration has been written by Gurney (*Ibis* 1876, pp. 469-470): "I think it more convenient to use both generic names, as indicating two distinct groups, which are naturally separated by the totally different character of their immature plumage."

However, *Baza* is a much smaller bird than the others, with a comparatively shorter tail, as well as more delicate in every other proportion. The wing formula is also remarkable: the first primary is equal to the sixth, the second is longer than the fifth but shorter than the fourth, while the third is longest. Such differences when written may not convey much, but the wing of *Baza* is comparatively a short rounded one when contrasted with that of any of the other species previously associated under that genus-name.

The fourth group is the one associated with the Australian species and which includes *Lophastur jerdoni* Blyth. Many subspecies are recognised in this group with more than one species. These take on the mature plumage of the first species of *Aviceda* as their adult one, but their immature one differs little and they never have the spotted immature characteristic of *Aviceda.* Having discarded *Baza,* it was necessary to find a substitute and I at once considered *Lepidogenys,* which was introduced by Gould in connection with the Australian bird. When doing so, however, he wrote: "This bird would belong to M. Lesson's genus *Lophotes,* but that term having been previously employed, I have been induced to adopt the generic title proposed by Mr. J. E. Gray in its stead. The form is somewhat allied to *Pernis.*"

This prohibits the recognition of *Lepidogenys* as anything else but a substitute name for *Lophotes* Lesson, and it thus becomes a synonym of *Baza.*

When Blyth met with a form of this group, being well acquainted with *Baza*, he did not hesitate to separate it generically, calling the species which was also new to him *Lophastur jerdoni.* This name was ranked as a synonym of "*Baza*" *reinwardti* Muller by Sharpe, but this was erroneous, and Blyth's form has since been recognised. It undoubtedly belongs to the same group as *subcristata,* and thus Blyth's name is available.

The bill is comparatively short and sharply hooked, with a long overhanging point succeeded by a notch and two tooth-like projections quite unlike the gentle sinuation seen on the lower edges of the upper mandible of all the preceding genera: the lower mandible is somewhat spoon-shaped, with truncate square end and saw-like projections on the anterior half of the edges. The cere is small and the nostril is practically closed, being overhung by an operculum, so that only a linear opening is seen. The head bears an occipital crest of a few feathers.

The wing is long with the fourth primary longest, the third slightly shorter and equal to the fifth, while the second is longer than the sixth, the first about equal to the seventh.

The tail is long and square, almost exactly two-thirds the length of the wing.

The legs are short and half-feathered at front, and the scaling is practically all reticulate, a slightly larger row on the front being figured as transverse scutes by Gould.

According to the preceding notes, I would subdivide *Baza* Auct. into four divisions, which I here consider genera, and criticism must come from the osteologist.

These four genera are:

Aviceda Swainson	..	*cuculoides* and *verreauxi.*
Nesobaza Mathews	..	*madagascariensis.*
Baza Hodgson	..	*leuphotes.*
Lophastur Blyth	..	*jerdoni, subcristata,* etc.

It will be noted that the name of the type of *Baza* is written *leuphotes* Dumont, not *lophotes* Temminck. This is due to the examination of the *Dict. Sci. Nat.* (Levrault), full particulars of which have been published in the *Austral Avian Record,* Vol. III., pp. 5-20, June 30, 1915. On p. 5 it was shown that *Falco leuphotes* was proposed by Dumont in Vol. XVI., p. 217, which was published on April 8th, 1820. The same bird was figured and named *Falco lophotes* by Temminck and Laugier in the 2nd Livraison of the *Planch. Color. d'Ois.*, pl. 10, which did not come out until September 1820.

I have recognised four stages in the development of the plumage in the supergenus *Baza*, and we see *Aviceda* passes through the first, second and third and seems to be approaching the fourth.

Nesobaza may have the first but stops at the second, somewhat improving upon it; *Baza*, however, misses the first, second and third, and only takes up the fourth; *Lophastur* misses the first and takes on a plumage like the third but with a phase somewhat recalling the second, while some of the forms appear to be developing the fourth stage.

Such interesting facts need names to record them, and it seems unscientific to hide them under the false cloak *Baza*, as that is the superlative effort in the evolution of this group. A peculiar feature is the diminished size in the effort, as *Baza* is the least of all the group.

I have just observed that Sharpe in the *Handlist of Birds*, Vol. I., 1899, continued *Baza* as a member of his subfamily Falconinæ, which is, in my opinion, judging from skins alone, quite wrong, and which Milne Edwards from osteological examination has decided was incorrect.

However, I further find that the acceptance of the genus-name *Baza* for the association as used by Sharpe, Gurney, Hartert and many others is incorrect on the score of priority alone. Upon investigation I find that *Baza* appears in the December (1836) number of the *Journal Asiatic Society* of Bengal, and as this number contains an account of the proceedings at the meeting held on January 4, 1837, the name was not published until after that date, but how long after I have not ascertained.

Aviceda was fully diagnosed in the first volume of the *Classification of Birds*, p. 300. This part appeared, according to my friend Dr. C. W. Richmond, on October 1, 1836. It is more completely described with a figure in the second volume, p. 213, and this was published on July 1, 1837. Meanwhile, in the first volume of the *Birds of Western Africa*, Swainson again described it, giving a coloured plate of the bird, p. 104. This, according to Dr. Richmond, was published on March 18, 1837, but I find a note in the *Analyst*, Vol. VI., p. 174, stating it was published before March 8, 1837.

Consequently *Aviceda* has priority over *Baza*, and the choice now lies between *Aviceda* and *Lophastur* for the Malaysian forms. From a phylogenetic study I have accepted the latter, differentiating *Baza* as a very distinct genus.

No. 308.

LOPHASTUR SUBCRISTATUS.

CRESTED HAWK.

(PLATE 251.)*

LEPIDOGENYS SUBCRISTATUS Gould, Synops. Birds Austr., pt. III., pl. 46, Apl., 1838: New South Wales.

Lepidogenys subcristatus Gould, Synops. Birds Austr., pt. III., Apl., 1838; *id.*, Proc. Zool. Soc. (Lond.) 1837, p. 140, Dec. 1838; *id.*, Birds Austr., Vol. I., pl. 25, 1848; Witmer Stone, Austral Av. Rec., Vol. I., p. 146, 1913.

Baza subcristata Gray, Genera Birds, Vol. I., p. 23, 1845; Gould, Handb. Birds Austr., Vol. I., p. 56, 1865; Ramsay, Proc. Zool. Soc. (Lond.) 1867, p. 393 (Q.); Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 357, 1874; Ramsay, Proc. Zool. Soc. (Lond.) 1875, p. 579 (Q.); *id.*, Cat. Austr. Accip., p. 45, 1876; *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 177, 1878; Masters, *ib.*, p. 269 (N.T.); Gurney, Ibis 1880, p. 462; *id.*, List Diurn. Birds Prey, p. 89, 1884; Ramsay, Tab. List Austr. Birds, p. 1, 1888; Broadbent, Proc. Roy. Soc. Queensland, Vol. V., p. 15, 1889 (Q.); North, Austr. Mus. Cat., no. 12, p. 15, 1890; *id.*, Aust. Mus. Cat., no. 4, p. 49, 1898; Hall, Key Birds Austr., p. 2, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 29, 1901; Berney, Emu, Vol. V., p. 18, 1905 (Q.); Hall, Key Birds Austr., 2nd Ed., p. 2, 1906; Mathews, Handl. Birds Austral., p. 42, 1908; Barnard, Emu, Vol. XI., p. 22, 1911 (N.Q.); North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 255, 1912; Mathews, List Birds Austr., p. 110, 1913.

Aviceda subcristata Lafresnaye, Rev. Zool. 1846, p. 127.

Pernis subcristatus Kaup, Isis 1847, p. 339.

Baza subcristata subcristata Mathews, Nov. Zool., Vol. XVIII., p. 251, 1912.

Baza subcristata queenslandica Mathews, *ib.*, Mackay, Queensland.

DISTRIBUTION. New South Wales; Queensland; Northern Territory.

Adult male. Middle of back and scapulars brown with white bases to the feathers above and below; upper wing-coverts dark slate colour, as also the bastard-wing, primary-coverts and quills, paler on the inner webs of the latter with dark cross-bands and white edges to the tips of the primaries; lower back, rump, and upper tail-coverts dark slate-grey; tail also slate-grey narrowly barred with black towards the base and a broad subapical band of the same colour with white

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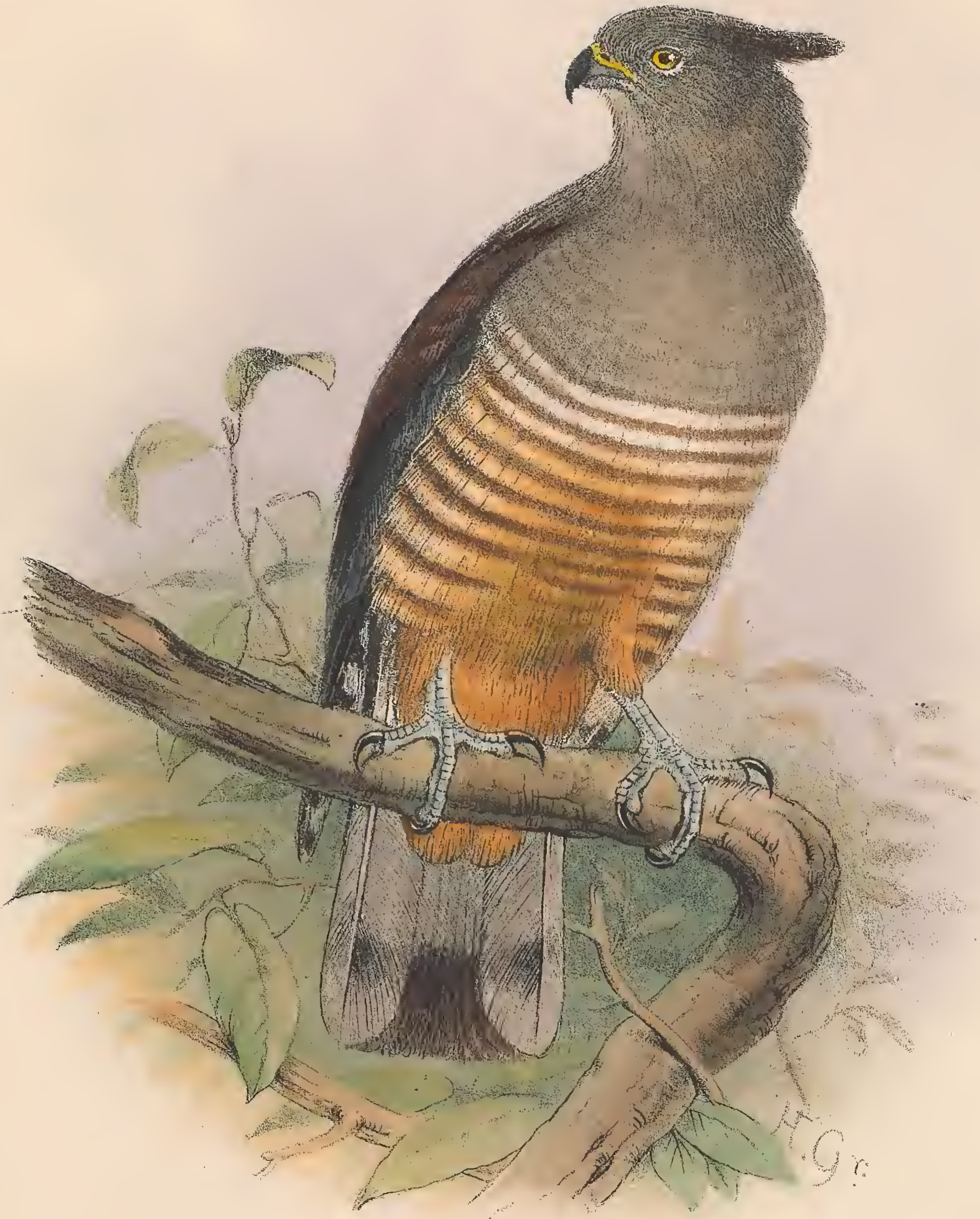
* The Plate is lettered *Baza subcristata.*



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BAZA SUBCRISTATA.

(CRESTED HAWK).

mottlings on the inner webs towards the base, the outer pair of feathers paler, the grey at the tips more extended and the black band much reduced in width; crown of head and nape slate-grey, the tips of the crest-feathers blackish; eyelids blackish; sides of face and mantle pale slate-grey; the feathers of the fore-head, cheeks and throat have black, hair-like shafts; throat and fore-neck ash-grey with an ochreous tinge; breast, sides of body and flanks rather broadly barred with chestnut and white, the white being tinged more or less with chestnut; lower abdomen, vent, under tail-coverts, thighs and under wing-coverts uniform fawn colour; axillaries white barred with grey; the greater series of the under wing-coverts white tinged with fawn colour; lower aspect of quills and tail-feathers silvery-grey with dark bars; second to fifth primaries incised on the outer web, inner webs scarcely incised. Bill blue-black, cere blue; eyes and eyelid yellow; feet bluish-white. Total length 480 mm.; culmen 22, wing 328, tail 195. Figured. Collected in New South Wales.

An adult from Queensland has the breast, sides of body and flanks barred with bronze-brown and white.

Adult female. Similar to the adult male but larger. Wing 342 mm., tarsus 38. Collected at Mackay, Queensland.

Immature has the head dark brown; mantle and breast rufous; the bars on the under-surface narrower and lighter in colour; under tail-coverts and under wing-coverts like the breast; tail greyish-brown crossed by four darker bands; upper-surface brown with rufous edgings; primaries and secondaries tipped with white. As the birds get older, the bars on the tail become more and more obsolete and the end becomes black, the rest becomes more as in the adult; the head becomes bluer-grey and the breast grey; the bars on the breast increase in width and in the fully adult are brownish-grey.

Nest. Composed of sticks and lined with leaves. Outside measurements: 15 inches by 8 deep; inside 6 by 2 deep.

Eggs. Clutch, three or four. Bluish-white. Axis 41-44 mm., diameter 34-35.

Breeding-season. October to December.

THIS beautiful bird was first described by Gould, whose notes read: "I am not sufficiently acquainted with this singular species to give any account of its habits and economy; but judging from the feebleness of its bill and talons and the shortness of its tarsi, I conceive that it principally preys upon insects and their larvæ; and it is not improbable that honey and the larvæ of bees and ants, which abound in Australia, may form a portion of its food. . . . I saw it soaring high in the air over the plains in the neighbourhood of the Namoi, but never sufficiently near to admit of a successful shot. All the specimens I have seen were collected either at Moreton Bay or on the banks of the Clarence."

Ramsay added: "Usually found (at Rockingham Bay) in pairs about the margins of the scrubs and bushes. It is a harmless, inoffensive species, feeding chiefly on insects and their larvæ, or occasionally on dead animals."

Berney has noted: "On 30th June, 1902, I was fortunate enough to get a good look with my glasses at close quarters at one of these curious Hawks. It showed no sign of fear of me, and as it clung to an almost upright limb, peering round at me, first on one side, and then on the other, its actions and pose were most Parrot-like. I have not seen it before or since."

From Cape York Barnard wrote: "One pair observed early in the season, and later was noticed feeding three large young birds. The only pair observed."

North gives some notes regarding the nidification of this bird in the *Austr. Mus. Spec. Cat.*, No. 1, and I quote the following: "Mr. Savidge remarks: 'I witnessed a novel performance of the Crested Hawk to-day. During flight one of these birds, by several sharp flaps of its wings, ascended quite perpendicularly in the air for six or eight feet, then reversing itself came rolling down again for about the same distance. This performance it repeated many times, uttering the while a peculiar note unlike that made by any other species of Australian Acciptres. At times these birds soar very high: I have also seen them pick something off the leaves and branches of trees while on the wing. . . . The Crested Hawk is sparingly dispersed in the Clarence River District, where it is a resident species, and is a most useful bird, eating large numbers of locusts, beetles, etc. It is frequently shot by the settlers, their utility being quite unknown to most of them.' Mr. Savidge's account of the 'tumbling' propensities of this bird is endorsed by Mr. Robert Grant, who wrote: 'I found *Baza subcristata* in the scrubs of the Upper Bellinger River, near Boat Harbour, while collecting for the Trustees of the Australian Museum in August 1892. In the early morning, close to my camp on the river, a large bird used to fly over from the scrub on the opposite side, and in so doing would turn over on its back and strike upwards at some imaginary foe; this it used to do every fifty or sixty yards, all the while uttering a clear whistling cry. I knew it was a bird of prey of some species, so one morning I got into a favourable position and waited for its coming, shot it, and to my surprise, when I picked it up, found it was a Crested Hawk; this specimen is in the Australian Museum Collection. Previous to this I had shot this species on the tablelands near Herberton, North Queensland. We used to find them on the edge of the dense scrubs, but never far in from the forest lands. Among the contents of the stomach of the bird I shot on the Bellinger River were the remains of insects and portion of a bandicoot.'"

Though little has been recorded about its habits, it has a somewhat voluminous scientific literature, through the fact that it is only subspecifically separable from the forms inhabiting the islands directly to the north; and as Gould was the first to describe any of these subspecies, his becomes the species name.

I will only note the conclusions of two workers regarding these northern forms, as they are mainly of technical interest.

CRESTED HAWK.

In the *Nov. Zool.*, Vol. VIII., p. 378-9, 1901, Hartert discussed the races and admitted the following:

"*Baza subcristata subcristata* Gould .. Northern Australia. Four specimens from Queensland.

"*Baza subcristata reinwardti* Müller .. Southern Moluccas, New Guinea, Aru, Key, Salwatty and Lesser Sunda Islands, from Sumba and Timor to Dammer and Djampea.

"The shorter wing of this form (difference about 2 to 3 cm.) is apparently the only constant character by which to separate the two forms.

"*Baza subcristata bismarcki* Sharpe .. New Ireland, Duke of York Islands, New Hanover.

"Abdomen with the ground-colour white, under wing-coverts very light. Wing about as long as in the Australian form.

"*Baza subcristata gurneyi* Ramsay .. Solomons Island.

"Like *bismarcki*, but smaller."

"*Baza subcristata rufa* Schlegel .. Northern Moluccas only, including Obi Major.

"At once distinguishable by the dark rufous appearance of the undersurface and dark rufous under-wing and under-tail coverts. The Celebesian and other more western forms belong to different species."

The preceding will indicate that when island forms are under discussion, minute differences are accepted for subspecific differentiation, but when mainland forms are concerned huge differences are minimised: that is, a couple of miles of sea are a sufficient barrier when five hundred miles of land may not be. As an absolute matter of fact, the reverse is often the case; a few miles may constitute an absolute barrier on land while hundreds of sea miles do not.

However, in the *Nov. Zool.*, Vol. XX., 1913, p. 305, Streseman further studied the forms of *Baza subcristata* (Gould). He divided them into three sub-groups, but this was simply an artificial grouping for cabinet purposes and did not express any genetic relationship. The forms admitted by Streseman are:

B. s. subcristata Gould	Australia.
B. s. timorlaoënsis A. B. Meyer	Timorlant to Lombok; Djampea, Bonerate (?), Kalidupa.
B. s. pallida nov.	Kei and Sudöst Island.
B. s. reinwardtii Müller	Ceram, Ambon, Buru.
B. s. megala nov.	Fergusson Island.
B. s. megala > *reinwardtii*	British New Guinea.

B. s. megala < reinwardtii	Dutch New Guinea, Mysol: Salwatty.
B. s. gurneyi Ramsay	Solomons Island.
B. s. bismarcki Sharpe	Bismarck Archipelago.
B. s. rufa Schlegel	North Moluccas, Obi.

As an instance of the splitting in connection with these forms may be cited Streseman's diagnosis of his *B. s. pallida*, which is "Like the preceding but smaller." Measurements are then given for this as "♂ 286, 294, 295," while of the preceding the only two from the typical locality are "♂ 285 (juv.) 297 (juv.)." This would be absurd were it not confirmed by the other figures given of the birds associated by Streseman as follows: "♂ 295, 296, 297, 300, 301, 304, 305, 306." Thus the extreme measurements are only 11 mm., and this in this Order is not sufficient, as in the next form Streseman himself admits 19 mm. variation. As a matter of fact, I have not considered size much in connection with these birds as regards subspecific distinction.

From the preceding it must be somewhat obvious that this species, being a sedentary one, has varied to a greater or less extent throughout the islands. A natural conclusion would be that as it ranges over a thousand miles directly south in Australia, variation might there be observed.

In the *Nov. Zool.*, Vol. XVIII., p. 251, 1912, I separated the Queensland form from the New South Wales (typical) bird with the following diagnosis: "Differs in having less rufous on the under tail-coverts and under wing-coverts, the bars on the under-surface being wider and darker, more brown, not so reddish."

In my "List" I discarded this form, but now, reviewing the species, I would maintain it, as I find the differences constant, and I now recognise in Australia three forms as follows:—

Lophastur subcristatus subcristatus Gould	New South Wales; South Queensland.
Lophastur subcristatus queenslandicus Mathews	Queensland (Mackay to Cairns).
Lophastur subcristatus kempi, subsp. nov.	North Queensland (Cooktown to Cape York).

Type ♀ collected by Mr. Robin Kemp at Skull Creek, Cape York, 22/12/12.

These birds are much lighter above, especially on the lower hind-neck and upper wing-coverts, while the tail is also lighter when compared with *L. s. queenslandicus*: the bars on the under-surface are narrower and lighter in colour, while the under tail-coverts are noticeably paler rufous. They are also slightly smaller.

GENUS—FALCO.

FALCO Linné, Syst. Nat., 10th Ed., p. 88, 1758	..	Type *F. subbuteo.*
Hypotriorchis Boie, Isis 1826, col. 976	..	Type *F. subbuteo.*
Dendrofalco Gray, List Genera Birds, p. 3, 1840	..	Type *F. subbuteo.*

SMALL Falconine birds with hooked toothed bills, long wings, long tails and short legs and feet.

The bill is short, sharply hooked, with a distinct notch or tooth on the edges of the upper mandible, while the under mandible is shallow with blunt squarish end and notches along the edges. The cere is comparatively small, while the nostrils are circular with a central bony obstruction.

The wings are very long and pointed, with the second primary longest, but the first almost as long and equalling the third, the rest rapidly decreasing.

The tail is long, slightly rounded, and is just over half the length of the wings.

The legs are short; the tarsal-covering consists of reticulate scales, much smaller, almost minute, on the hinder aspect of the tarsus.

The toes are stoutish and long, the middle toe exceeding the tarsus in length.

The Australian bird here assigned to *Falco* agrees very closely with the type of the genus, and as that name has been very loosely applied, I herewith give a few remarks on the views of the genus held by various workers.

Kaup, in the *Contrib. Ornith.* (Jardine) 1850, p. 51, in his subfamily Falconinæ, ranged five genera, viz.: *Hierax, Tinnunculus, Harpagus, Falco* and *Ieracidea.* The first, third, and fifth he could not subdivide, but the second and fourth provided each a full complement of subgenera, viz., *Polihierax, Erythropus, Pœcilornis, Tichornis* and *Tinnunculus* as subgenera of *Tinnunculus,* and *Æsalon, Hypotriorchis, Gennaia, Falco* and *Hierofalco* as subgenera of *Falco.*

Sharpe, in the *Cat. Birds Brit. Mus.,* Vol. I., 1874, only admitted three genera, with no subgenera, for these two genera, viz., *Cerchneis, Falco* and *Hierofalco.*

Gurney commented on this proposition as follows (*Ibis* 1881, p. 277): "I propose now to consider the cluster of species which Mr. Sharpe has associated under the generic title of *Cerchneis,* and which appears to me to include three natural groups sufficiently distinct to be treated as at least separate subgenera, bearing the several names of *Dissodectes, Tinnunculus* and *Erythropus*. . . . (*Ibis* 1882, p. 146). I have now to refer to the two species which constitute the subgenus *Erythropus*, and which seem to me to form a distinct natural group intermediate between the true Kestrels and the Hobbies. . . . (p. 152). The remainder of the Falcons are arranged by Mr. Sharpe under two genera—*Falco* and *Hierofalco*; but it seems to me that they may be more naturally assorted into the following generic or subgeneric groups, viz., *Hypotriorchis, Æsalon, Chicquera, Falco, Gennaia* and *Hierofalco*."

In the *List of Diurnal Birds of Prey*, Gurney admitted the genera *Dissodectes, Tinnunculus* (with subgenus *Erythropus*), *Hypotriorchis, Æsalon, Chicquera* and *Falco* (with subgenera *Gennaia* and *Hierofalco*).

It may be observed that Gurney talks about "natural groups." Recent writers, whom I shall afterward quote, deny the existence of "natural genera," so that it is not surprising that their ideas do not coincide with those of Gurney.

In the *Handlist of Genera and Species of Birds*, Vol. I., 1899, Sharpe relented so far as to admit as a genus *Erythropus*, but otherwise ignored Gurney's work.

In the *American Ornithologists' Union's Checklist*, 3rd Ed., 1910, one genus *Falco* is admitted with five subgenera *Hierofalco, Rhynchodon, Tinnunculus, Rhynchofalco* and *Cerchneis*. This is not a natural grouping.

In the *Handlist of British Birds* by Hartert, Jourdain, Ticehurst and Witherby, this same genus *Falco* is admitted with no subgenera.

An attempt, quite unsatisfactory, to improve upon this appeared in the *B. O. U. List of British Birds*, 2nd Ed., 1915, where two genera *Hierofalco* and *Falco* were utilised.

In the *Nov. Zool.*, Vol. XXII., p. 183, 1915, Hartert quoted *Hierofalco candicans* as used by Sharpe, and against the genus name wrote: "An unnecessary burden! Moreover, wrongly limited, because all the Lanner group belong to the same section, having absolutely the same structure of the feet and otherwise."

This is a rather remarkable statement from the writer after stating "Falcons have been my favourite birds," and "I have doubtless examined more Falcons than any one else." These remarks may be quite true, but I would conclude from a study of Gurney's articles that Gurney examined Falcons more critically, and his conclusions as to their affinities are more valuable than Hartert's lumping.

I herewith give my criticism of the groups made from an examination of the birds and without dependence upon any published results.

FALCO.

Falco is a Linnean genus, and as typical of it for many years the magnificent Peregrine Falcon was regarded. That bird was, however, unknown to Linné in 1758, so that some other species had to be so fixed. This point was discussed by the American Ornithologists' Union's Committee in 1886, when they designated *Falco subbuteo* as type. Previously the group typified by *Falco subbuteo* had been considered generically separable, but it is certainly the nearest in every superficial feature to the Peregrine group. The Little Falcon of Australia is quite typical, being even ranked by the lumper Schlegel as only a form of *Falco subbuteo*. This view is not accepted by recent lumpers, and it is quite possible that future lumpers will not accept the generic lumping of present day genus-lumpers.

In *Falco sensu stricto*, which consists of small birds, the bill is short, much hooked with toothed mandible edges: the wings are very long, the first primary almost as long as the second, which is longest, and longer than the third—the fourth, fifth and sixth rapidly decreasing. The legs are long and thin, the toes also long and thin, the middle toe noticeably lengthened. The tail is long and square or slightly rounded.

In *Rhynchodon* practically the same features exist without alteration, although the birds are immensely superior in size, and peculiarly the same coloration is seen. Superficially the rank to be accorded to *Falco* would be sub-generic, but osteological examination has led workers in that field to distinguish between these two forms generically.

It should be noted that here we see color retained through a vast alteration in size, and that in this group color is apparently coincident with generic associations. As a matter of fact, it should be recorded that all genus-lumpers are such, through association with fellow workers who generally guided them in the first instance by means of colour.

In the *American Ornithologists' Union's Checklist*, 3rd Ed., 1910, an attempt was made to utilise subgenera with the following results:

Genus *Falco*—
    Subgenus *Hierofalco*
        Rhynchodon
        Tinnunculus
        Rhynchofalco
        Cerchneis.

Such an association is not in accordance with the differences seen as hereafter recorded. Thus, if *Rhynchodon* be considered as only subgeneric to *Falco*, the others must be considered genera.

Thus *Hierofalco* consists of large birds, even larger than *Rhynchodon*, with distinctly different feet: the wing formation is peculiarly similar, but even there a slight difference can be seen, as, though the second is still the longest, the first and third are subequal and little less. The feet are stronger and the toes are short and stout, the middle toe not especially long. When we see that the features, including coloration, peculiar to *Falco* are retained in *Rhynchodon*, though the size has increased to that of *Hierofalco*, the peculiarities of *Hierofalco* must be emphasized not minimized, and *Hierofalco* regarded as a genus. *Tinnunculus* is remarkable for its coloration, which is quite different from that of the preceding. The legs and feet are thin, the birds being small, and the long middle toe is comparative with that of *Falco*. A feature of great interest, however, is the wing formation: the first primary, though long, is shorter than in any of the preceding genera and is only equal to the fourth; though the second may be longest, it is only subequal with the third, and these noticeably exceed the first and fourth. As the wing formation of *Falco* is almost exactly that of *Rhynchodon*, and *Hierofalco* differs little, the peculiarities in this direction in the case of *Tinnunculus* merit generic distinction. *Cerchneis* is also well marked by means of its coloration, and here we see a variation in quite another direction: the wing agrees nearly with that of *Tinnunculus*, in that the first is even slightly shorter than the fourth, the second and third longest, the second sometimes surpassing the third. Here, however, though the legs are long, the toes are short, and this genus is as well differentiated from *Falco* (as a matter of fact better) as *Astur* is from *Accipiter*. Yet in the *American O. U. List*, as above noted, *Cerchneis* is only subgenerically differentiated from *Falco*, while *Astur* is generically separated from *Accipiter*. From my knowledge of American ornithologists and their methods, I conclude this degradation of *Cerchneis* is due to an oversight.

In the *British O. U. List*, 2nd Ed., an even more inconsistent classification is seen, as not only is *Accipiter* generically regarded as distinct from *Astur*, but this point has been emphasized (in other places) by the makers of that List. Yet *Cerchneis* is absolutely merged into *Falco* without reason. In this case, I believe that examination of the birds themselves, rather than reliance (or otherwise) on literature, would have relieved the List from this erroneous grouping.

It is quite possible that the species *vespertinus* is responsible for the confusion apparent, as this species has the wing formation agreeing almost exactly with that of *Falco*, while the feet are quite like that of *Cerchneis*. A peculiar coloration accompanies these features, which I consider an important matter in this Family.

I would therefore regard the groups mentioned as each worthy of generic rank from the superficial study of the skins alone. Is it not remarkable, then, that osteologists, ignorant to a great extent of the factors above mentioned, have arrived at a similar conclusion? It would be quite unwise to say that such were prejudiced by the classification prepared by systematists ignorant of osteology.

P. R. Lowe in the *Ibis*, 1915, p. 715, has recorded in another group: "It is interesting to note that neither Gray, Seebohm, nor Mathews had studied the skeletal features of this form, but that, nevertheless, by the examination of what are generally held to be superficial characters, they arrived at a near appreciation of the peculiarities of this interesting Snipe-like form."

I suggest that, similarly, the peculiarities superficially evident in the above Falconine groups are certainly accompanied by peculiar osteological characters, and that the facts above recorded necessitate the acceptance of the groups above admitted.

It is interesting to note that six species of *Falcon* occur in Australia, and it is probable that each belongs to a different genus. One has been recognised ever since 1837 as a distinct genus, but the rest have been peculiarly treated. One is a true *Falco* and another is a true *Cerchneis*, the third a *Rhynchodon*; the other two are peculiar types, one of which seems like a Lanner, but the material is not adequate to determine exactly its relations and therefore I leave it in *Falco*. For the last I proposed the genus name *Notofalco*, and it is almost as remarkable as *Ieracidea*, the genus named by Gould in 1837 and ever since recognised. *Ieracidea* is remarkable for its long legs and small feet: the legs have a row of scutes in front, whereas all the other Falcons have reticulations throughout. The wing has the third primary slightly exceeding the second, comparatively subequal, while the first, though long, is shorter than the fourth.

Notofalco is a big Falcon with a very long tail: the feet are strong, the legs long, and the toes short, but not as small as those of *Ieracidea*. The wing has the second primary longest, the third, however, longer than the first, which exceeds the fourth.

These two forms, *Ieracidea* and *Notofalco*, are not easily derived from any Northern group, so that both must belong to the earliest Northern migration. The former is the commonest Australian Falconiform and has many peculiar features; the latter is almost the rarest Falconiform, and its dark coloration is its most outstanding character, but probably its osteology will prove as remarkable as that of *Ieracidea*. The Lanner-like Falcon might produce a surprise by showing it to be not closely related to the Lanners and a third Australian puzzle; moreover, it probably also is referable to the earliest Northern migration.

No. 309.

FALCO LONGIPENNIS.

LITTLE FALCON.

(PLATE 252.)

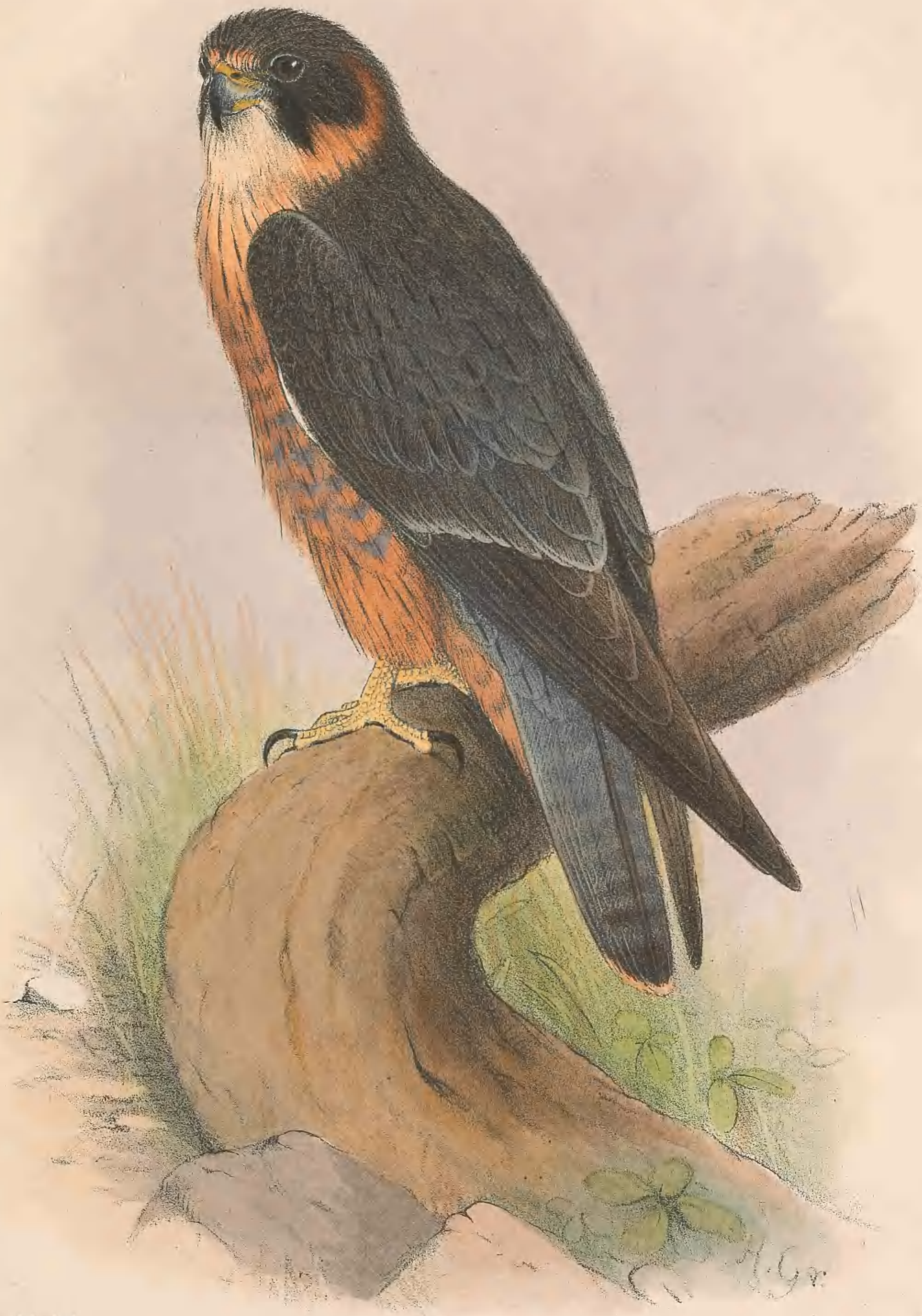
FALCO LONGIPENNIS Swainson, Anim. in Menag., p. 341, Jan. 1838: Tasmania.

Lunated Falcon Latham, Gen. Synops. Birds, Suppl. II., p. 54, 1801.

Falco lunulatus Latham (not Daudin 1800), Suppl. Index Ornith., p. xiii., 1801 (N.S.W.); Gray, Ann. Mag. Nat. Hist., Vol. XI., p. 189, 1843; Gould, Handb. Birds Austr., Vol. I., p. 29, 1865; Ramsay, Proc. Zool. Soc. (Lond.) 1867, p. 393 (Q.); Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 398, 1874; *id.*, Proc. Zool. Soc. (Lond.) 1875, p. 339 (Q.); Ramsay, *ib.*, p. 579 (Q.); *id.*, Cat. Austr. Accip., p. 51, 1876; *id.*, Proc. Linn. Soc. N.S.W., Ser. 2, Vol. I., p. 1096, 1887 (N.W.A.); Legge, Papers Proc. Roy. Soc. Tasm. 1886, p. 237, 1887 (Tas.); Ramsay, Tab. List Austr. Birds, p. 1, 1888; North, Austr. Mus. Cat., no. 12, p. 19, 1890; Cox and Hamilton, Proc. Linn. Soc. N.S.W., Ser. II., Vol. IV., p. 398, 1890 (N.S.W.); North, Austr. Mus. Cat., no. 4, p. 57, 1898; Hall, Key Birds Austr., p. 3, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 34, 1901; A. G. Campbell, Emu, Vol. II., p. 10, 1902 (Vict.); Hall, *ib.*, Vol. III., p. 40, 1903 (N.W.A.); Berney, *ib.*, Vol. V., p. 18, 1905 (Q.); Hartert, Nov. Zool., Vol. XII., p. 209, 1905 (N.T.); C. F. B(elcher), Emu, Vol. V., p. 204, 1906 (Vict.); Austin, *ib.*, Vol. VII., p. 28, 1907, N.S.W.; Mathews, Handl. Birds Austral., p. 42, 1908; Barnard, Emu, Vol. IX., p. 29, 1909 (Q.); Mathews, *ib.*, p. 57, 1909 (N.W.A.); Gibson, *ib.*, p. 72, 1909 (S.W.A.); Crossman, *ib.*, p. 86, 1909 (W.A.); Littler, Handb. Birds Tasm., p. 7, 1910 (Tas.); Ogilvie-Grant, Ibis 1910, p. 168 (W.A.); Whitlock, Emu, Vol. IX., p. 191, 1910 (W.A.); Hill, *ib.*, Vol. X., p. 267, 1911 (N.W.A.); Barnard, *ib.*, Vol. XI., p. 22, 1911 (N.Q.); Stone, *ib.*, Vol. XII., p. 113, 1912 (Vict.); North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 272, 1912; Hill, Emu, Vol. XII., p. 245, 1913 (Central); Macgillivray, *ib.*, Vol. XIII., p. 152, 1913 (Q.); Barnard, *ib.*, Vol. XIII., p. 206, 1913 (N.T.).

Sparvius lunulatus Vieillot, Nouv. Dict. d'Hist. Nat., Vol. X., p. 324, 1817; *id.*, Tabl. Ency. Meth., Vol. III., p. 1264, 1823.

Falco longipennis Swainson, Anim. in Menag., p. 341, Jan. 1838; Mathews, List Birds Austr., p. 110, 1913; S. A. White, Trans. Roy. Soc. South Austr., Vol. XXXVIII., p. 425, 1914 (Central).



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FALCO LONGIPENNIS.

(LITTLE FALCON).

LITTLE FALCON.

Falco frontatus Gould, Synops. Birds Austr., pt. III., pl. 42, 1838 (Apl.), (N.S.W.); *id.*, Proc. Zool. Soc. (Lond.) 1837, p. 139, 1838 (Dec.), (N.S.W.); *id.*, Birds Austr., Vol. I., pl. 10, 1848; Sturt, Exped. Centr. Austr., Vol. II., App., p. 14, 1849 (Central); Diggles, Orn. Austr., pt. XI., 1867; Witmer Stone, Austral Av. Rec., Vol. I., p. 146, 1913.

Falco rufiventer Gould, Proc. Zool. Soc. (Lond.) 1837, p. 97, 1838: *nomen nudum.*

Hypotriorchis frontatus Gray, Genera Birds, Vol. I., p. 20, 1844.

Hypotriorchis rufiventer Bonaparte, Consp. Gen. Av., Vol. I., p. 25, 1850: *nomen nudum.*

Falco subbuteo frontatus Schlegel, Mus. de Pays-Bas, Vol. II., Falcones, p. 22, 1862.

Hypotriorchis lunulatus Gray, Handl. Gen. Sp. Birds, pt. I., p. 20, 1869; Gurney, Ibis 1882, p. 153; *id.*, List Diurn. Birds Prey, p. 103, 1884.

Falco lunatus Sharpe, Hist. Coll. Nat. Hist. Brit. Mus., Vol. II., p. 111, 1906.

Falco lunulatus lunulatus Mathews, Nov. Zool., Vol. XVIII., p. 252, 1912.

Falco lunulatus murchisonianus Mathews, *ib.* (East Murchison, West Australia).

Falco lunulatus apsleyi Mathews, Austral Av. Rec., Vol. I., p. 33, 1912, Melville Island.

Falco frontatus frontatus Mathews, *ib.*, p. 189, 1913.

Falco frontatus murchisonianus Mathews, *ib.*

Falco frontatus apsleyi Mathews, *ib.*

Falco longipennis longipennis Mathews, *ib.*, Vol. II., p. 7, 1913.

Falco longipennis murchisonianus Mathews, *ib.*

Falco longipennis apsleyi Mathews, *ib.*, p. 8; *id.*, Ibis 1914, p. 109.

Falco melanotus Mellor and White, Emu, Vol. XII., p. 161, 1913: *nomen nudum*; S. A. White and Mellor, *ib.*, p. 164 (First descr.), Flinders I.

DISTRIBUTION. Australia; Tasmania.

Adult male. General colour above slate-grey, rather darker on the head and lesser upper wing-coverts and slightly paler at the tips of the inner secondaries and the upper tail-coverts, the feathers everywhere having dark shaft-lines; middle tail-feathers and outer webs of the lateral ones barred with dark brown, the inner webs of the outer feathers barred and tipped with pale rufous; primary- and secondary-quills have pale rufous ovate markings on the inner webs, the second primary-quill incised on the outer web and the first on the inner web; sides of face blackish; lores, chin and throat buffy-white; the black of the hinder face is skirted with rufous which extends on to the feathers on the sides of the hind-neck; remainder of the under-surface rufous with dark shaft-lines to the feathers; sides of the body and upper abdomen barred with pale slate-grey; under wing-coverts similar but paler, the light markings taking the form of large buffy-white spots. Bill bluish, tip darker, cere yellow, orbital space bluish-grey, eyes dark brown, feet mealy yellow. Total length 327 mm.; culmen 14, wing 245, tail 128, tarsus 34. Figured. Collected at Derby, North-west Australia, on the 25th of June 1886.

Adult female. Similar to the adult male, but larger. Wing 270 mm.; culmen 17, tarsus 37. Collected on Parry's Creek, North-west Australia, on the 10th of February, 1909, by Mr. J. P. Rogers.

Immature. Are rather like a small edition of *Rhynchodon*, being blackish-brown above with rufous-buff edges to the feathers; under-surface dark reddish with much darker centres. As the birds get older the feathers of the back become grey with whitish edges; the under-surface becomes lighter. In the next stages they become adult.

Nest. The nest of another species that builds a platform nest of stick, relined with soft bark.

Eggs. Clutch, three. Ground-colour almost hidden by reddish-brown markings, mostly thicker at the larger end. Axis 44-48 mm.; diameter 32-35. (Dawson River, Queensland).

WHEN Gould made his first big incursion into Australian Ornithology he named almost every specimen he could get as a new species and therefore assigned to this bird the name of *Falco frontatus.* It was figured in the *Birds of Australia* under the same name, though in the *Annals and Magazine of Natural History*, Vol. XI., p. 189, 1843, G. R. Gray had proposed to use instead *Falco lunulatus* as of Latham. This usage was based on an examination of the Watling Drawings, and as Gould was an upholder of the Law of Priority he discarded his own name for that of Latham when he drew up his Handbook published in 1865. Consequently Latham's name gained acceptance and was unhesitatingly recognised until I drew attention to the fact that Latham's name was invalid. At that time I wrote (*Austral Avian Rec.*, Vol. I., p. 189, 1913): "*Falco lunulatus* Latham is preoccupied by Daudin. . . . The next name is *Falco frontatus* Gould, which was published in January 1838, while *Falco longipennis* Swainson, as far as I know at present, was not published until later, and not 1837 as given in the 'Reference List.' On the previous page (251) of the 'Reference List' *Falco melanogenys* Gould was preferred to *Falco macropus* Swainson, but the years are given incorrectly in each case as 1837."

This note attracted the attention of Dr. C. W. Richmond, who at once kindly indicated my error, and I published a further correction in the next number of the *Austral Avian Rec.*, Vol. II., p. 7, 1913, noting that Swainson's name was published on January 1st, 1838, while Gould's *frontatus* was not out till April 1838.

The species-name of this bird therefore must be *longipennis* Swainson. At the same time I indicated that *Falco melanotus* White and Mellor, from Flinders Island, must be considered a synonym.

Captain S. A. White has written me: "The Little Falcon is never seen in numbers anywhere in South Australia: an occasional pair will be met with here and there; they seem to prefer open-timbered country to the plains.

"For my Flinders Island bird see *Emu*, Vol. 12. I have compared this skin with a great many from Tasmania and it shows a remarkable distinction; the collar-band is entirely wanting in this bird. I saw a pair at close quarters: only secured one. They are very swift of flight and call very loudly. Another section of the party who were camped on Cape Barren Island (which is only a mile or so from Flinders Island) shot another bird (which unfortunately they did not preserve), and those who saw it say it resembles my skin in every detail."

Dr. Morgan has given me the following note: "Found in small numbers over the southern portion of South Australia. I have not seen them north of Port Augusta: they are still to be seen within a few miles of Adelaide, and even occasionally come into the city itself. I have on several occasions seen one at the golf-links 7 miles from Adelaide, once beating about the eaves of the golf-house searching for sparrows. They live chiefly upon small birds such as sparrows and starlings, which they seize upon the wing. I once at the River Fenniss, near Lake Alexandrina, saw one attack a white-fronted Heron: the Heron made off, uttering harsh screams and evidently much alarmed, but the Falcon did not do it much harm. I have never found a nest."

Mr. Tom Carter has contributed this note: "The Little Falcon is much more numerous than the Black-cheeked, but cannot be called a *common* species. I have observed them from the mid-west to the extreme south-west. In the wet year of 1900 they were constantly seen about the North West Cape. They are occasionally seen about Broome Hill, and when visiting Lake Muir in 1911 I shot one that had just caught an *Epthianura albifrons*."

In the record of his trip into the Interior of Australia, Capt. S. A. White (*Trans. Roy. Soc. S.A.*, Vol. 38, p. 425, 1914) writes: "These swift-flying birds were fairly numerous in comparison to other members of the hawk tribe. A pair were nearly always found at the waters, where they preyed upon small parrots and finches. It is a very bold and daring bird."

North, in the *Austr. Mus. Spec. Cat.*, No. 1, has many good notes in connection with this bird, and the following will bear quotation: "Mr. K. H. Bennett, at Mossgiel, New South Wales, wrote—'*Falco lunulatus* is frequently met with in this locality, although it is by no means plentiful. Its prey consists chiefly of small birds such as Quail, etc., to which is added some of the larger insects, like the mantis and grasshopper. In habit it is bold in the extreme. One morning whilst at breakfast I observed one of these birds fly several times past the verandah, and now and again make a dash at some creepers with which it was covered. On going out I found a young Swallow, just able to fly, had either fallen out, or left a nest of these birds under the verandah and had fluttered into the creepers, and this attracted the Falcon. I caught the young Swallow with the intention of placing it in the nest, and whilst doing so held it by the legs, which caused it to flutter, when without any hesitation the Falcon darted into the verandah and struck the swallow in my hand, one claw penetrating my thumb, and clutched the young bird. Incredible as it may appear, the Falcon commenced eating the Swallow whilst perched on my hand, although my mother and two of my sisters were standing alongside of me. With my free hand I caught the Falcon by the legs, and a piece of string being obtained, tied it to the verandah post, where after a few fruitless attempts to escape, he eventually gave it up as hopeless and assumed a defiant attitude. On throwing the body of the dead Swallow to him he at once clutched and devoured it, as he did with a *Myzantha flavigula* I shot and threw to him. On several occasions I have found their nests, which are almost always placed in an inaccessible situation.' Mr. G. A. Keartland's notes read: 'The White-fronted Falcon (*Falco lunulatus*) is found everywhere, either on the coast or far inland. I shot a pair at Brighton (Victoria) whilst they were endeavouring to capture some Pigeons. This Falcon possesses extreme keen sight, and singles out its prey at a great distance. It then flies fast and low until within striking distance, when it seldom fails to secure its victim. In Central Australia I saw one dash into a flock of Finches drinking at a rock pool, and before the little birds could scatter sufficiently to escape, it seized one in each foot, and then flew away with them. At Brookman Creek, Western Australia, a flock of Cockatoo-Parrakeets were drinking on the water's edge, when a White-fronted Falcon suddenly dashed into their midst. The Cockatoo-Parrakeets scattered in all directions, but the Falcon pursued and caught one which flew towards me, and was making off with it when I fired, knocking some feathers out of the Falcon. It dropped the Cockatoo-Parrakeet to the ground, but in a few seconds it swooped down on its victim, and was carrying it away, when another shot caused it to again drop the bird, which was quite dead when picked up. The White-fronted Falcon is more courageous and stronger on the wing in proportion to its size than any other representative of the Falconinæ. It always chooses living prey and will seize and carry off birds exceeding itself in weight, and can overtake and capture the fastest flying Parrakeets. During the breeding season they frequently make raids on domestic Pigeons kept in the centre of the city, and carry off the strongest homing Antwerps.' "

Hall, in the *Emu*, Vol. III., p. 40, 1903, gave J. P. Rogers' note made in North-west Australia as follows: "This morning I saw this species (*Falco lunulatus*) keeping low and flying at a tremendous rate immediately above the grass. Some Wood Swallows (*A. cinereus*) seeing the Hawk coming while they were perched in a tree, and the Hawk still 200 yards away, rose directly high into the air. One was singled out, and the Hawk, keeping below it, drove it still higher into the air. Going still higher, the Swallow then turned and made for the ground with the Hawk in close pursuit. It was a wonderful sight to see the Hawk, not more than one yard in the rear, following every turn of the bird pursued. Three times the Hawk missed his blow. When within 20 yards of the ground it made its final attack, and succeeded in securing its prey. Then shooting into the air some 40 feet, it dropped to the ground."

Berney (*Emu*, Vol. V., p. 18, 1905) observed: "This species is only to be seen (Richmond District, North Queensland) very occasionally. It is the most daring, I think, of the family, and the most feared by its victims. What grand birds they would make for the falconer!"

An interesting item by E. D. Barnard appears in the *Emu*, Vol. IX., p. 29, 1909, from Gladstone, Queensland: "Some little time ago the noise of the dray I was driving startled a common bat from his hiding-place in the hollow spout of a tree. A Little Falcon (*Falco lunulatus*) perched on the top of a high tree instantly noticed the bat, and dashed down to secure (as he thought) an easy prey. But as he swooped, the bat ducked, and apparently diving between the Falcon's legs, fluttered away. The Falcon turned like a flash and quickly overtook the little fugitive, with the same result. Time and again did the Falcon swoop, his claws outspread to grip, and time after time did the bat, by his fluttering, dodgy flight, evade his pursuer. At length, the bat, seeing a hollow spout near, dashed into it, and next second the Falcon settled, but—too late."

From Kimberley, North-west Australia, Hill noted (*Emu*, Vol. X., p. 267, 1911): "These birds (*Falco lunulatus*) were very uncommon excepting in March and April. The crops of two birds examined contained portions of two small birds and many locusts."

Macgillivray has published the following in the *Emu*, Vol. XIII., p. 152, 1914: "Writing from Sedan, Mr. M'Lennan sent the following notes: 24th February, 1910.—'Saw a Little Falcon trying to catch dragonflies at the swamp. Sometimes it caught them, but more frequently missed.' 31st March, 1910.—'When returning from the Big Dalgonelly Lake to Byromine, a Little Falcon accompanied me for some distance, catching the grasshoppers as they rose from under my horse's feet. It was very quiet, and would let me approach to within a few feet of it when perched on a tree.' 4th April, 1910.—'A pair of Little Falcons at the Big Dalgonelly Lake have taken possession of an old Whistling Eagle's nest at the edge of the lake, and will probably breed there later on.' Also noted at Cape York."

In my "List" I admitted three subspecies (p. 110-1) thus:

Falco longipennis longipennis Swainson (Tasmania).

Synonyms: *Falco lunulatus* Latham (not Daudin), (New South Wales).
Falco frontatus Gould (New South Wales).
Falco rufiventer Gould (nom. nud.).
Falco melanotus White and Mellor (Flinders Island).

Distribution: East Australia; Tasmania.

Falco longipennis murchisonianus Mathews (East Murchison, West Australia).
Distribution: South and Mid-west Australia.

Falco longipennis apsleyi Mathews (Melville Island).
Distribution: Northern Territory, North-west Australia.

F. l. murchisonianus I introduced in the *Nov. Zool.*, Vol. XVIII., p. 252, 1912, with the diagnosis: "Differs from *F. l. lunulatus* in its much paler coloration on the upper and under-surface," and *F. l. apsleyi* in the *Austral Avian Rec.*, Vol. I., p. 33, 1912, as follows: "Differs from *F. l. lunulatus* in its blue-grey upper-surface and paler under-surface; and from *F. l. murchisonianus* in its larger size."

Later, White and Mellor described *Falco melanotus* from Flinders Island, Furneaux Group, as follows:

"*Adult female.*—Fore-head, crown of the head, cheeks, ear-coverts, and all the upper-surface glossy black; primaries dull black, with exception of tips, and marked on the internal webs with oval spots of brown; two centre tail-feathers almost black, with very indistinct markings of bluish-grey: remaining tail-feathers black, marked with many spots (in some cases almond-shaped) of reddish-brown, all slightly tipped with buff; throat and head yellowish-white, some of the feathers of the latter slightly marked with black. All the under-surface a rich rufous colour, many of the feathers marked down the centre with black; feathers on flank and thighs blotched strongly with black, upper tail-coverts bluish-black, tipped with bluish-grey; centre of tail-feathers marked with black. Iris brown, bill horn colour, black at tip, feet grey, nails black.

"Total length 13 inches; wing 10 inches."

No remarks were given indicating how this bird differed, if at all, from any other Hawk, and the only comparison I know of is the one here published, forwarded to me by Captain S. A. White. The type-locality of Swainson's *Falco longipennis* is Tasmania, and that of Gould's *F. frontatus* is New South Wales. If *F. melanotus* were separable, *F. frontatus* should be; further, the name selected by White and Mellor is invalid, but if the bird be separable it could be called *Falco longipennis samueli.*

Since I separated my forms, the acquisition of more material and more prolonged study causes me to discard all subspecies for the present. None of the characters utilised have been found constant, and I am compelled to refer all the variations seen to individualistic causes. Notwithstanding this conclusion, it may be that still longer and more perfect series will show later the possibility of differentiating subspecies. The large number of *Ieracidea* I have now got together has given more light than the smaller number (though not small) I had previously.

LITTLE FALCON.

I find that North has written: "With a species having so wide a geographical range there is the usual amount of individual variation found in the plumage of the adults of both sexes, especially in specimens from widely separated localities, although occasionally in examples from the same district." This could have been cited as confirming subspecific distinctions, but I have been quite unable to fix any subspecies, however I have criticised the birds.

No. 310.

FALCO HYPOLEUCUS.

GREY FALCON.

(Plate 253.)

Falco hypoleucos Gould, Proc. Zool. Soc. (Lond.) 1840, p. 162, 1841; West Australia.

Falco hypoleucus Gould, Proc. Zool. Soc. (Lond.) 1840, p. 162, 1841; *id.*, Birds Austr., Vol. I., pl. 7, 1848; Sturt, Exped. Centr. Austr., Vol. II., App., p. 13, 1849 (Central); Gould, Handb. Birds Austr., Vol. I., p. 24, 1865; Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 394, 1874; *id.*, Proc. Zool. Soc. (Lond.) 1875, p. 339 (Q.); Ramsay, *ib.*, p. 579 (Q.); *id.*, Cat. Austr. Accip., p. 49, 1876; *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 177, 1878; *id.*, Tab. List Austr. Birds, p. 1, 1888; North, Austr. Mus. Cat., no. 12, p. 17, 1890; Cox and Hamilton, Proc. Linn. Soc. N.S.W., Ser. II., Vol. IV., p. 398, 1890 (N.S.W.); North, Austr. Mus. Cat., no. 4, p. 53, 1898; Hall, Key Birds Austr., p. 3, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 33, 1901; Berney, Emu, Vol. V., p. 18, 1905 (Q.); Mathews, Handl. Birds Austr., p. 42, 1908; Whitlock, Emu, Vol. VIII., p. 178, 1909 (W.A.); Mathews, *ib.*, Vol. IX., p. 56, 1909 (N.W.A.); *id.*, Nov. Zool., Vol. XVIII., p. 252, 1912; North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 265, 1912; Mathews, List Birds Austr., p. 111, 1913; Witmer Stone, Austral Av. Rec., Vol. I., p. 146, 1913.

Hierofalco hypoleucus Bonaparte, Rev. Mag. Zool., 1854, p. 535.

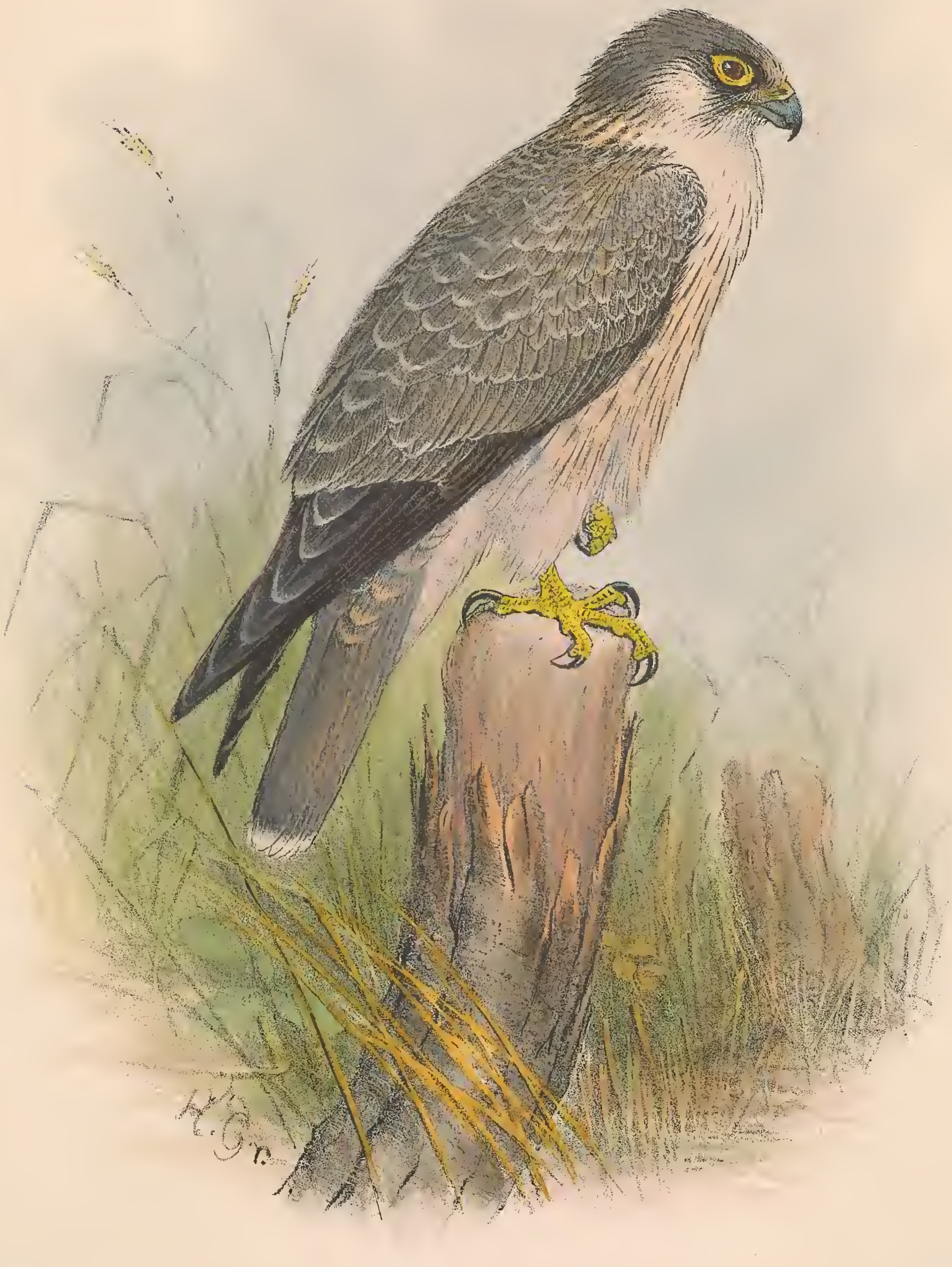
Gennaia hypoleuca Gurney, Ibis 1882, p. 450.

Falco hypoleucus ashleyi Mathews, Austral Av. Rec., Vol. II., p. 73, 1913; South Australia.

Distribution. Australia: *not* Tasmania.

Adult female. Head, back and wing-coverts bluish-grey, lighter on the rump: all the feathers have black shaft-streaks; under-surface light grey with black shaft-streaks; under wing-coverts white with black shafts; tail grey crossed with about twelve dark bars, which become lighter towards the base, upper tail-coverts showing light-coloured bars; primary-coverts blackish, the inner webs marbled; primaries blackish, the inner webs notched with black and marbled. Soft parts as in the figured specimen. Total length 395 mm.; culmen 16, wing 298, tail 135, tarsus 45. Collected in South Australia. The sexes are alike, the female being slightly the larger.

Immature male. General colour pale slate-grey with dark shaft-lines and whitish margins to the feathers of the back, wings and tips of tail-feathers; bastard-wing, primary-coverts and primary-quills darker and inclining to blackish with whitish tooth-like marks on the inner webs of the latter; some of the tail-feathers have indications of pale bars on the inner webs; the feathers on the hind-neck are white



H. Grönvold. del.

Witherby & C°.

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FALCO HYPOLEUCOS.

(GREY FALCON).

with dark pear-shaped marks, the dark portion of the feather becoming more extensive on the feathers on the sides of the neck; a narrow black ring encircles the eye which spreads out below on to the face; base of fore-head and ear-coverts dull white streaked with brown; throat and entire under-surface, including the under tail-coverts, axillaries and under wing-coverts, with dark shaft-streaks to the feathers, which widen out on the sides of the body and under wing-coverts, taking the form of bars on the greater series of the latter; a buffy tinge pervades the under-surface, especially on the sides of the body. Bill, tip of lower and distal half of upper mandible leaden brown, remainder blue-grey; eyes brown; eye space yellow; feet and tarsus bright yellow. Total length 420 mm.; culmen 17, wing 286, tail 143, tarsus 41. Figured. Collected on Parry's Creek, North-west Australia, on the 5th of December, 1908, by Mr. J. P. Rogers.

Younger birds have the shafts of the feathers of the under-surface much wider and the white under tail-coverts crossed with one or two bars. Wing 294, culmen 17, tarsus 44. A female collected at Broken Hill, New South Wales, and given me by Dr. W. Macgillivray.

Nest. Large and loosely built of sticks and lined with fine bark. Inside measurements 8 inches by 6 deep.

Eggs. Clutch, two to four. Buff coloured, and covered with small spots of rusty-red or blotches of the same colour. Axis 49-53 mm.; diameter 36-38.

Breeding-season. July to October.

UNTIL this bird was forwarded by Gilbert to Gould it had not previously been observed by any explorer as far as I have traced. Thus it is another of the fine Australian Falconiformes that stands to the credit of Gould. In connection with this group Gould named sixteen species and eleven of these names are now in use for separable forms. In his "Handbook" Gould quoted his account given in his folio work: "Of this rare and beautiful Falcon I have seen only four examples. The specimen . . . was presented to Mr. Gilbert by Mr. L. Burgess, who stated that he had killed it over the mountains, about sixty miles from Swan River: subsequently it was obtained by Mr. Gilbert himself in the vicinity of Moore's River in Western Australia; and my friend Captain Sturt had the good fortune to secure a male and a female during his late adventurous journey into the interior of South Australia. 'They were shot at the Depôt in May, 1845: they had been soaring very high, but at length descended to the trees on the creek, and coming within range were shot.'

"The acquisition of the *Falco hypoleucus* is highly interesting, as adding another species to the true or typical Falcons and as affording another proof of the beautiful analogies which exist between certain groups of the southern and northern hemispheres—this bird being as clearly a representative of the Jerfalcon of Europe as the *Falco melanogenys* is of the Peregrine and the *Falco frontatus* of the Hobby," but corrected this last statement: "When comparing this species with the Falcons of the northern hemisphere, *F. candicans*, *F. islandicus*, and *F. gyrfalco*, I have omitted to mention that, however identically typical in form it may be, and however similar in structure to those noble birds, it is far more feeble and less able to cope with large sized prey than its representatives of the snowy and glacial regions. In point of courage it will probably prove to be entitled to the first rank among the Australian *Falconidæ*."

Captain Sturt's own account reads: "The Grey Falcon (*Falco hypoleucus*) was shot at the Depôt, at which place during our long stay, Mr. Piesse, my storekeeper, was very successful with my gun. A pair, male and female, were observed by him one Sunday in May, whilst the men were at prayers, hovering very high in the air, soon after which he succeeded in killing both. They came down from a great height and pitched in the trees on the banks of the creek, and on Mr. Piesse firing at and killing one the other flew away, but on returning to look for its lost companion, shared its fate. Nothing could exceed the delicate beauty of these birds when first procured. Their large full eyes, the vivid yellow of the cere and legs, together with their slate-coloured plumage, every feather lightly marked at the end, was quite dazzling; but all soon faded from the living brightness they had at first. These two specimens were the only ones seen during an interval of seventeen months that the party was in the interior, and these, it appears probable to me, were on the flight and were attracted down to us."

Mr. G. A. Keartland's notes, which I quote from North, *Austr. Mus. Spec. Cat.*, No. 1, Vol. III., p. 268, 1912, read: "The Grey Falcon (*Falco hypoleucus*) is occasionally met with in Gippsland, but I have only shot two, both of which were in quest of chickens at the farms where I was staying. It is more frequently seen in the West MacDonnell Ranges, Central Australia, than any other part I have visited. Still occasionally pairs may be found right across from North-western Australia to Queensland. Although strongly built they are slow fliers, and are usually seen skimming just over the tops of the *Triodia* tussocks, ready to pounce on any lizards, snakes or small animals such as mice, jerboa or rats. When its wants are supplied it usually perches on the highest branch of a dead tree, where it remains until disturbed or hunger necessitates further exertion. Their nests are built of sticks and closely resemble those of the Brown Hawk, but their eggs are of a light brown colour."

Berney (*Emu*, Vol. V., p. 18, 1905), writing from North Queensland states: "Never saw these (*Falco hypoleucus*) on the open country of Wyangarie, but since coming over on to the scrubby basalt ranges of Spring Valley I have noticed them more than once, and obtained one for identification on the 1st June, 1905. It proved to be a young male just changing from immaturity to maturity, the white feathers still showing among the grey.

It had breakfasted off a Dove (*G. tranquilla*) and was just commencing a meal on a Betcherrygah (Warbling Grass Parrakeet) when I interrupted proceedings."

So little has been recorded of this rare bird that I think it worth adding Dr. W. Macgillivray's account given by North in the *Austr. Mus. Spec. Cat.*, No. 1, Vol. III., pp. 267-268, 1912: "Some few years ago a bird-catcher brought me a pair of young Grey Falcons (*Falco hypoleucus*). They soon became very quiet and tractable, and remained so, their disposition contrasting with that of three Black-cheeked Falcons which I had in an adjoining cage. These latter birds never made friends with me, and I let them go. The Grey Falcon is sparingly dispersed throughout the district, several pairs coming under our observation during our outback trip in September, 1909. The first pair we found nesting on Gardiner's Creek, about fifty miles north from Broken Hill, on the 13th September. As we were going up the Creek the female first flushed from her nest in a tall tree, then the male from a smaller nest lower down, where he had evidently been sheltering from the wind. The real nest, a large loosely-built structure, after the style of a Raven's, was placed on a small limb at the very top of the tree sixty feet from the ground. On account of the size of the limb it was difficult of access, but Mr. W. M'Lennan, by careful climbing, managed to take a clutch of three fresh eggs from the nest, which was lined with wool. On the 15th September we found another nest of this species on Sturt's Meadow's Creek, just below the homestead, placed as before on a thin limb at the very top of a Gum-tree; as it was evening when we found it, and our camp was only a few hundred yards away, we left it till morning after watching the female settle herself on the nest for the night. In a hollow of the same tree a Cockatoo (*Cacatua sanguinea*) had its eggs. Whilst Mr. M'Lennan was climbing to the nest early next morning, the two birds sailed uneasily round and round above the tree, but made no attempt to defend their home. The nest was at a height of eighty feet from the ground by measurement. It was as large as a Little Eagle's nest, loosely built of sticks and lined with wool. Four slightly incubated eggs were in it. The birds uttered no kind of cry at any time. On the same day that we found this nest, off a small creek near the White Cliffs-road, we saw another pair of these birds, which had evidently taken possession of an old Wedge-tailed Eagle's nest in a Leopard-tree, a nesting cavity having been shaped in the old nest, but no eggs laid. Budgerigars were flying at frequent intervals down these creeks, dropping off to breed here and there. Black-breasted and Rufous Song Larks were breeding freely, the former on the plains and the latter in the undergrowth and rank herbage along the creeks;

young Barnard Parrakeets were hatching out, soon to be followed by numerous broods of Galahs and Blood-stained Cockatoos, so that the young of the Falcons would not lack food. Another pair were seen on the 24th September, in a Box flat at Langawirra, but had not yet nested. On our return journey, when exploring Jalcowinna Creek on the 10th October, Mr. M'Lennan and I saw a female Grey Falcon attack, in most vigorous fashion, a Raven which was very glad to escape out on to the plains. We soon found the Falcon's nest, built high up on a slender leaning branch of a Gum, as near to the top of the tree as possible, sixty feet from the ground. The nest was loosely constructed of twigs and small branchlets, and lined with fine bark, the egg cavity being eight inches in diameter and six inches deep; it contained four eggs in an advanced stage of incubation. As with the others, these birds made no attempt to defend their nest, flying round at a respectful distance. During my trip in September, 1911, I only came across one pair of these birds: they had a nest on Jalcowinna Creek, placed as usual on the topmost branch of a Eucalyptus; the nest contained three young birds not long hatched."

Dr. A. M. Morgan has written me: "*Falco hypoleucus.* I had three specimens of this bird given to me at Laura, near where they had been shot in the Flinders Ranges. My brother, Mr. E. R. Morgan, took a clutch of two eggs near Mount Gunson, 105 miles N.W. of Port Augusta, on July 31, 1899. I saw a single bird at Kallioota near Lake Torrens in August, 1912, and Mr. J. M. Merryfield of that station took a clutch of two eggs on September 4, 1912: the nest was built in a large gum-tree near a creek. The first clutch measure 5.25 × 3.90 and 5.50 × 3.90 cm., and the second 5.35 × 3.80 and 5.25 × 3.90 cm. The eggs are not distinguishable in colour from those of *Hieracidea berigora*, but those in my collection are somewhat more elongate in form."

Ramsay, in the *Proc. Zool. Soc.* (Lond.) 1875, p. 579, observed: "This exceedingly scarce bird was met with by Inspector Robert Johnstone, Esq., of the Herbert river, on the tablelands due west of Cardwell, and on the ranges thereabouts; J. B. White, Esq., of Springsure, due west inland from Rockhampton, likewise noticed it, and was fortunate enough to obtain several specimens. The young differ slightly from the adults, and, like others of the tribe, are occasionally mottled with brown on leaving the nest."

I am not admitting any subspecies here, though in the *Austral Avian Record*, Vol. II., p. 73, 1913, I described *Falco hypoleucus ashbyi* with the note: "This new subspecies differs from *F. h. hypoleucus* Gould in being darker above and light blue-grey on the under-surface—not white; all the feathers have a dark centre line. The tail is barred.

"Type, South Australia.

"Gould figured the bird from West Australia beautifully in his 'Birds of Australia.' This plate he afterwards cancelled, and later figured the birds collected by Captain Sturt at the Depôt, South Australia. Those who, like myself, have the cancelled plate, can see the difference by comparing the two."

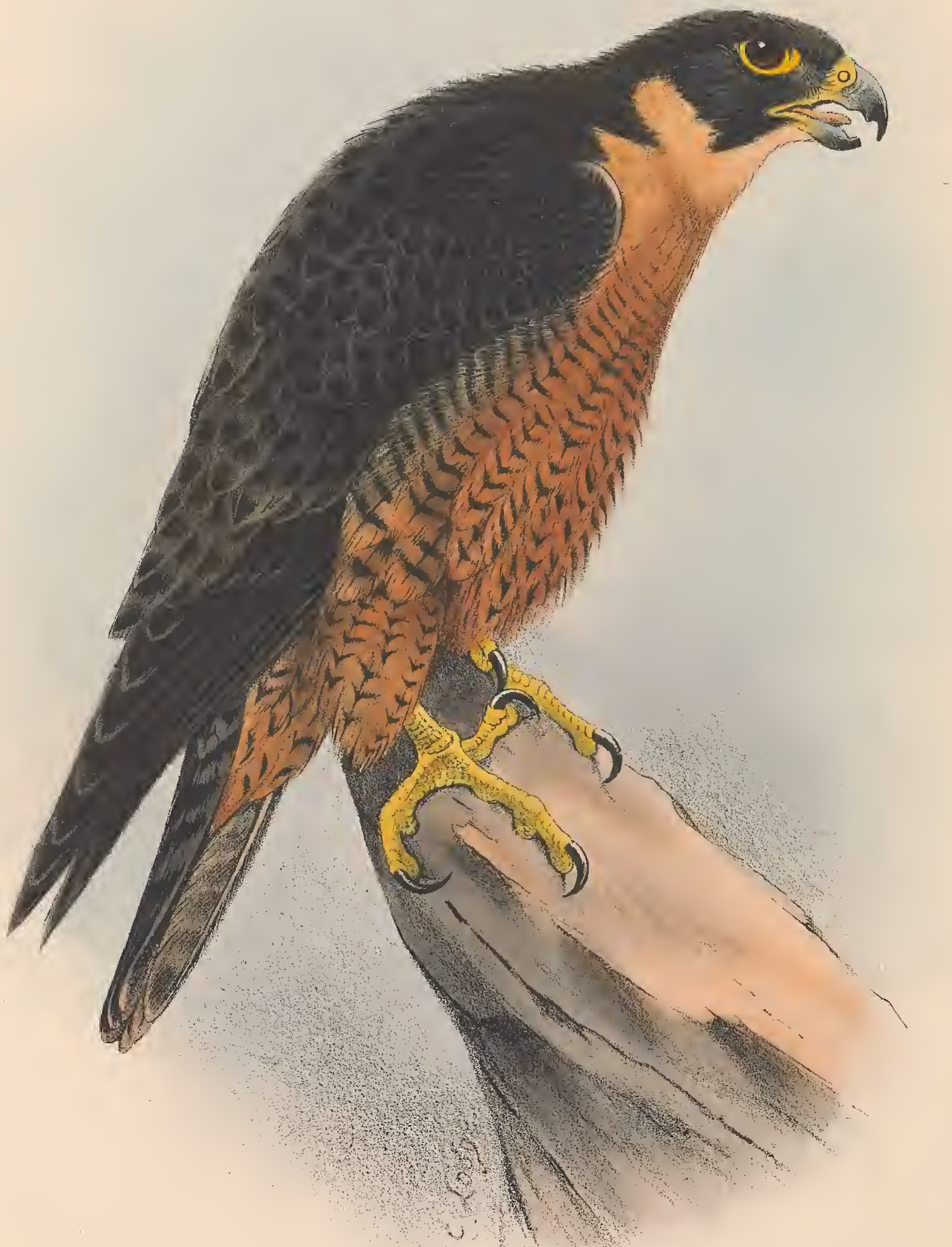
I have observed that this species seems nearest to the Lanner Falcons with which it was placed by Gurney. Bonaparte, following Gould's first impression, associated it with the Gyr Falcons. It has little, if anything, to do with these, seeing that the structure of the feet is the same as that of the Lanners.

GENUS—RHYNCHODON.

RHYNCHODON Nitzsch, Obs. Av. art. Carot. Comm., p. 20, 1829	Type *R. peregrinus.*
Euhierax Webb and Berthelot, Hist. Nat. Canar. Vol. II., Ornith., p. 5, 1841	Type *R. peregrinus.*

LARGE Falconine birds with strong hooked bills, toothed on all edges of mandibles, long wings, long tails, and strong legs and feet.

In coloration and formation the species of *Rhynchodon* agree with those of *Falco*, but are immensely superior in size. The birds have comparatively shorter tails, but comparatively longer, stronger legs and feet. Osteologists have found characters whereby to separate these generically. Superficially they might be regarded as subgenera.



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H. Grönvold, lith

Witherby & C°

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RHYNCHODON SUBMELANOGENYS.

(WESTERN BLACK-CHEEKED FALCON).

No. 311.

RHYNCHODON PEREGRINUS.

BLACK-CHEEKED FALCON.

(PLATE 254.)*

FALCO PEREGRINUS (Turnstall), Ornith. Brit., p. 1, 1771; Great Britain.

Falco macropus Swainson, Anim. in Menag., p. 341, Jan., 1838; Tasmania.

Bird Hawk, Latham, Gen. Hist. Birds, Vol. I., p. 228, 1821 (N.S.W.).

Falco peregrinus Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 183, 1827 (N.S.W.); Diggles, Orn. Austr., pt. xx., 1868 (Q.).

Falco macropus Swainson, Anim. in Menag., p. 341, Jan. 1838.

Falco melanogenys Gould, Synops. Birds Austr., pt. III., pl. 42, Apl. 1838 (Tas.); *id.*, Proc. Zool. Soc. (Lond.) 1837, p. 139, Dec. 1838; *id.*, Birds Austr., Vol. I., pl. 8, 1848; Sturt, Exped. Centr. Austr., Vol. II., App., p. 14, 1849 (Central); Gould, Handb. Birds Austr., Vol. I., p. 26, 1865; Ramsay, Proc. Zool. Soc. (Lond.) 1867, p. 393 (Q.); Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 385, 1874; Ramsay, Cat. Austr. Accip., p. 48, 1876; *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 177, 1878; Gurney, Ibis 1882, p. 302; *id.*, List Diurn. Birds Prey, p. 107, 1884; Legge, Papers Proc. Roy. Soc. Tasm. 1886, p. 237, 1887 (Tas.); Ramsay, Proc. Linn. Soc. N.S.W., Ser. 2, Vol. II., p. 166, 1887 (N.W.A.); *id.*, Tab. List Austr. Birds, p. 1, 1888; North, Austr. Mus. Cat., no. 12, p. 16, 1890; Cox and Hamilton, Proc. Linn. Soc. N.S.W., Ser. II., Vol. IV., p. 398, 1890 (N.S.W.); North, Austr. Mus. Cat., no. 4, p. 51, 1898; Hall, Key Birds Austr., p. 3, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 31, 1901; A. G. Campbell, Emu, Vol. II., p. 10, 1902 (Vict.); Carter, *ib.*, Vol. III., p. 34, 1903 (N.W.A.); C. F. B(elcher), *ib.*, Vol. V., p. 204, 1906 (Vict.); Hill, *ib.*, Vol. VI., p. 177, 1907 (Vict.); Batey, *ib.*, Vol. VII., p. 2, 1907 (Vict.); Mathews, Handl. Birds Austral., p. 42, 1908; Crossman, Emu, Vol. IX., p. 86, 1909, W.A.; Littler, Handb. Birds Tasm., p. 6, 1910 (Tas.); North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 258, 1912; Witmer Stone, Austral Av. Rec., Vol. I., p. 146, 1913; Barnard, Emu, Vol. XIII., p. 206, 1914 (N.T.).

Falco peregrinus melanogenys Mathews, Nov. Zool., Vol. XVIII., p. 251, 1912.

Falco peregrinus submelanogenys Mathews, Austral Av. Rec., Vol. I., p. 33, 1912; South-west Australia.

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* The Plate is lettered *Rhynchodon submelanogenys*.

Falco peregrinus macropus Mathews, *ib.*, Vol. II., p. 8, 1913.
Rhynchodon peregrinus Mathews, List Birds Austr., p. 111, 1913.
Rhynchodon peregrinus macropus Mathews, *ib.*
Rhynchodon peregrinus submelanogenys Mathews, *ib.*

Distribution. Australia ; Tasmania.

Adult female. Entire sides of face, crown of head, hind-neck and upper mantle blackish-brown with pale edges to some of the feathers on the hind-neck, where the feathers are marked with buff towards the base and indistinct grey bars on the upper mantle ; lesser upper wing-coverts, remainder of the wing-coverts, innermost secondaries, scapulars, back, rump, upper tail-coverts and tail blackish-brown barred with slate-grey, paler on the rump and upper tail-coverts where the grey bars are wider ; tail similar but more coarsely marked with rust-colored tips ; bastard-wing, primary-coverts and outer aspect of quills blackish-brown with mottled bars of buff on the inner webs and pale edges to the tips of both primary- and secondary-quills ; throat, fore-neck and upper breast pale rufous with a few dark shaft-lines ; lower breast, abdomen and under tail-coverts darker rufous, narrowly, but regularly barred with blackish-brown ; some of the long feathers on the flanks tinged with grey ; axillaries and under wing-coverts cinnamon with dark brown bars, greater series and quill-lining grey with pale bars tinged with cinnamon. Bill light bluish-lead colour, tip darker, cere, base of lower mandible and the corners of the mouth yellow ; eyes hazel, rim round the eye yellow ; feet yellow. Total length 470 mm. ; culmen 23, wing 318, tail 165, tarsus 55. Figured. Collected at Bokarum, Plantagenet District, South-west Australia, on the 14th April, 1900, and is the type of *Rhynchodon peregrinus submelanogenys.*

Adult male. Similar to the adult female but smaller.

Birds from the eastern parts of Australia (Queensland, New South Wales, Victoria, Tasmania, South Australia) are not so suffused with red on the under-surface. They are also larger. A female from Broken Hill, New South Wales, measures in the wing 330. Two from Victoria 324-335. South Australia 337.

Immature. Have practically no red on the under-surface, the feathers being buff, those of the thighs and abdomen having bars, those of the belly having a band, those of the breast having spots : upper-surface blackish-brown with rufous edges ; an older bird has the centre of the head and wing-coverts brown, remainder of head as in the adult ; the back shows some slate-grey.

As the bird gets older the under-surface becomes suffused with red and the feathers from the lower-breast to the vent are all barred, and the slate-grey becomes more pronounced on the upper-surface. The next moult brings them into the adult plumage.

Nest. The eggs are placed on the earth under a crevice of rock ; sometimes in a hollow limb of a tree.

Eggs. Clutch, two to three. Ground-colour buff, covered all over with markings of reddish-brown, more thickly round the middle of the egg, but the markings are very varied. Axis 49-53 mm. ; diameter 40-42.

Breeding-season. August to November.

The first record of this fine bird appears in the *Trans. Linn. Soc.* (Lond.), Vol. XV., p. 183, 1827, where Vigors and Horsfield called it *Falco peregrinus*, writing : "Upon a minute comparison of the specimen before us in the Society's collection, which is in a fine state of preservation, with some

European specimens of this species, we can discover no material difference between them. The native name of this bird is *Wolga*. The eyes, Mr. Caley observes, are of a bluish-black, the *irides* having a faint shade of hazel-brown in a strong light."

Sharpe, in the *Hist. Coll. Nat. Hist. Brit. Mus.*, Vol. II., p. 112, 1906, however, has recorded:

"No. 19. Hooded Falcon, Latham MS.

"This is *Falco melanogenys* Gould. Latham does not seem to have given a Latin name to the drawing. Watling's MS. note is: 'Half the natural size. It lives on small birds and fish, etc.'"

This refers to Watling Drawing No. 19, which is a good representation of this species, and the painting was made about 1790. It is curious that Latham never recognised the painting as that of a Peregrine nor gave it a name. Consequently it was not until 1837 that a peculiar name was bestowed upon the Australian form, when it simultaneously received two. Gould called it *Falco melanogenys,* while Swainson named it *Falco macropus.* The former name has been commonly accepted until very recently, as detailed under *Falco longipennis.* Research showed that though both descriptions were prepared in 1837, quite independently of each other, neither was published until 1838, and whereas Swainson's name was published on the 1st January, 1838, Gould's did not appear at the earliest until April of the same year. Consequently the accustomed name *melanogenys* must be rejected in favour of the prior name *macropus.*

Under the name *Falco melanogenys* Gould wrote: "What the Peregrine Falcon is to the continent of Europe and England, the *Falco minor* is to South Africa, the *F. peregrinoides* to the peninsula of India, and the Black-cheeked Falcon to Australia. All these species are of the same type; but I agree with Prince Charles Lucien Bonaparte and Professor Kaup in considering them to be distinct and representatives of each other in the respective countries they inhabit. The Duck-Hawk of America (*F. anatum*), as its trivial name implies, strikes down the *Anas obscura,* while the Peregrine (*F. peregrinus*) of Europe indulges a like taste by now and then taking a Mallard (*Anas boschas*); and Gilbert states that he has seen the Australian bird carry off a *Nyroca australis*—a species at least as heavy again as itself. . . . When I visited the colony in 1839 it was universally dispersed over the whole southern portion of Australia and Tasmania, and probably future research will discover that its range extends over all parts of the continent. It gives preference to steep rocky cliffs and the sides of precipitous gullies rather than to fertile and woodland districts, but especially seeks such rocky localities as are washed by the sea, or are in the neighbourhood of inland lakes and rivers. In such situations it dwells in pairs throughout the year, much after the manner of the Peregrine."

Dr. Morgan has given me a note: "These birds are sparingly distributed throughout the southern portions of South Australia. I have seen them as far north as Kallioota. At Laura they became fairly common at one time when the keeping of carrier pigeons became the fashion: a bird or two were constantly hanging about the outskirts of the town on the look-out for the pigeons, amongst which they wrought great havoc. A fine male bird was brought to me which I found on dissection to contain the whole of a pigeon, beak, bones, claws and many of the feathers. He was shot by the owner of the pigeon whilst sleeping off the effects of his meal. Two eggs of this bird taken from a cliff on the River Murray near Tailen Bend measure 5.35 × 3.90 and 5.00 × 3.90 cm."

Captain S. A. White states: "The Black-cheeked Falcon is not a common bird in South Australia, but is occasionally seen down south, often during times of drought. It is a bold, fearless bird, and will swoop down on its prey like an avalanche. Waterfowl, small birds and the like are all food to this bird."

From the *Austr. Mus. Spec. Cat.*, No. 1, I extract the following notes, which are all of interest. Mr. George Savidge has written: "The Black-cheeked Falcon (*Falco melanogenys*) is sparingly dispersed over the Upper Clarence River District. I saw a solitary specimen at Jamba, Clarence Heads, where I thought it quite in its element; a strong wind was blowing at the time, and it was flying low amongst the numerous Gulls and other sea-birds, upon which it no doubt preys. I did not observe it after any quarry there, but it seemed to be able to pass by the numerous birds quite easily. For power of wing and magnificent flight this fierce bird easily takes the palm of all the Accipitres inhabiting this part. I have been spellbound when this bird has suddenly, and without warning, made its swoop close to me. To hear the rushing sound as it dashes through the air with folded wings after ducks or pigeons is worth going a long way for. The male is a much smaller bird than the female, but equally as daring. I have watched them chase my pigeons until they became mere specks in the sky; at last the Falcon reaches them, or perhaps they head down to try to pass their pursuer (hard to decide at such a distance). I watched one make two unsuccessful swoops; he missed the bird twice, but at the third attempt the pigeon was seized and carried away. Upon one occasion, at our local pigeon match, a Falcon suddenly appeared and seized the pigeon which had been liberated from one of the traps and had been shot. It carried the pigeon away across the river, amidst the shouting of the many people assembled at the match. Usually they take them to the branch of a tree or on the ground to devour their meal. In May, 1909, a neighbour shot a Falcon which had seized a full-grown fowl and was tearing it to pieces. I have also witnessed it strike a full-grown fowl down, also Black Duck, and one day saw one chase a Black Cockatoo, which it appeared to attack from pure mischief, returning to the charge several times, but it did not succeed in killing the Cockatoo. They prey a good deal on the Blue Mountain Lorikeet (*Trichoglossus novæhollandiæ*), which seems to lose all power when confronted by one of these birds; this Lorikeet does not seem to employ its powers of flight to avoid the Falcon as it might do. The Rosella (*Platycercus eximius*) makes a much better fight for its life, also the Magpie Lark (*Grallina picata*), for although not quick flying birds they are expert dodgers. I saw a Black-cheeked Falcon chase a single Black Duck within ten yards of me. I fired at the Duck, and shot just behind it, the Falcon being about six feet behind; another second and he would have had him. The Black-cheeked Falcon constructs no nest whatever, but makes a light depression in the sand and crumbling debris on the shelves of rocks. In the year 1896 I robbed one pair of birds three times, viz., three eggs on the 16th August, three eggs on the 13th September, and two eggs on the 14th October. My aboriginal collector told me they reared young ones in the same place often; when robbed they usually remove from one shelf of rocks to another. Their home here is in the mountainous districts and the nesting-place is guarded by precipitous rocky walls, utterly forbidding, in almost every case, access by man from below, and not always to be reached safely from above, even with rope ladders. Upon one occasion the Falcons knocked the hat from the head of an aboriginal, making repeated swoops and charges when he was taking their eggs, screeching out loudly the while. One of us generally sat on top and kept waving sticks and handkerchiefs to keep them away. It is with regret I add that these noble birds have been almost entirely exterminated in these districts. They were such daring and constant visitors to the poultry yards, that they were easily shot; however, I visit their old nesting-places every year in the hopes of others coming and occupying their solitary homes." Dr. W. Macgillivray added: "*Falco melanogenys* is sparingly found throughout the whole district, preying mostly on birds of various kinds, from Ducks to Budgerigars, all killed on the wing, as is the manner of Falcons in general, by a lightning-like swoop and blow with the hind claw. This and the little Grey Falcon are a great trouble to the professional bird-catcher, as they continually take his call birds, and he often nets the Falcons and kills them. I have no note of the nesting of this Falcon, though I have had young birds not long from the nest brought to me by a bird-catcher. Mr. W. McLennan, when at Casterton, Victoria, went out on the 28th October, 1909, to look up a nesting-hollow of these birds from which he had taken young birds some years previously; he found the hollow, in a large Red Gum, contained two nearly fully-fledged young birds, as big as Brown Hawks, with bill horn colour tipped with black, iris yellow, legs yellow, crown of head and cheeks black, back dark brown, all the under-surface rufous with brown cross bars. From the feathers and castings in the hollow they were evidently being fed upon Musk and Little Lorikeets." Mr. G. A. Keartland recorded: "In North-western Australia it is known as the 'Snake Hawk,' owing to its energy in pursuit of these reptiles. . . . They were numerous near the Fitzroy River. When grasshoppers are plentiful these Falcons will feast upon them until almost too gorged to fly."

Batey has written in the *Emu*, Vol. VII., p. 2, 1907, of *Falco melanogenys* in Victoria: "My opinion is that, for rapidity of flight, this bird cannot be excelled. I have noticed it taking exercise—headlong plunges downwards and then shooting up vertically. It was somewhat rare our way, and was supposed to nest in the Eagle Rocks, situated on our run. The cliff in question is the finest on Jackson's Creek. Magpies, though very courageous, feared this Falcon greatly, for from observation, when other birds raised alarm cries on its approach, the Magpies consulted their own safety. Those years Musky Lorikeets, following up gum blossom, passed in droves. When pursued they endeavoured to escape by mounting aloft, but their enemy, shooting above them, darted downwards and pinned one with his strong talons. The poor thing screamed until the Falcon silenced it by a nip on the head with his sharp bill. Once after sundown a horde of Ravens was seen, perhaps a hundred yards in the air, when suddenly a Black-cheeked Falcon shot straight up and caught one, but the prey being too heavy, the captor fell with it to the ground at an angle of 45 degrees. We ran over, and the Falcon took flight, but the victim was stone dead—killed, I think, with a hard squeeze across the back. It is upwards of 20 years since this grand Falcon was noted in the old locality, the last pair seen was at the Hanging Rock, where presumably they nested."

I have no original notes concerning this bird from Tasmania, so am quoting some from North's *Austr. Mus. Spec. Cat.*, No. 1, as Tasmania is the typical locality of *macropus* Swainson, the name now used for the Australian Peregrine. Dr. Lonsdale Holden's notes read: "On the 25th September, 1886, I saw a pair of *Falco melanogenys* were nesting on the sheerest part of the sea face of Circular Head Bluff, about a quarter of the way down the precipice, and I climbed along a ledge which reached within ten yards of the crevice in which they were breeding. The birds flew screaming about me, dashing straight towards me and then sheering off when within a few yards. From time to time they perched on points of rock and sat watching me and occasionally would sail along the cliffs like a swallow. Last autumn and winter the birds were flying about Circular Head, and were generally observed returning to these cliffs in the evening very high in the air, and announcing their presence by screams, which are like the noise a slate pencil makes on a slate, or a railway carriage wheel tightly braked dragging along a rail. At times I have seen them flying in an aimless manner at a great height from the ground, like a hawking Swallow. They dip during the last few yards of flight, and sail gently upwards just before they alight. On the 16th September, 1887, I found the Black-cheeked Falcons nesting in the same place on Circular Head Bluff as the previous year. I saw one bird twice fly screaming to the crevice, where he was received with chuckling screeches, and immediately sail out again. I believe the male was feeding his incubating mate, but could not see if he carried any prey in his claws as he flew in. I saw two of these birds mobbing a White-bellied Sea-Eagle on the sandhills between East Inlet and the sea. I took two incubated eggs on the 4th October, 1888, from a nesting-place in the cliffs near the coast. The two birds kept flying at my face and uttering loud screams as I sat by the eggs, first from one side and then the other, making short circuits in the air and then dashing down. They came very close, not arm's length but hand's breadth of me, though I struck repeatedly at them. They even followed me when I retreated among the *Banksia* trees close at hand and sat down to pack the eggs. Compared with Circular Head Bluff these rocks, where this pair bred, which were only about sixty feet high, scarcely deserved the name of cliffs at all. On the 26th September, 1891, I took a set of three incubated eggs from the same nesting-place, but the birds were not at hand, although I saw one swooping a long way off. In September, 1893, the pair of birds at Circular Head Bluff nested again in the same inaccessible spot."

It will be gathered from Gould's observations that the Peregrine is found all over the world in various forms, and how close the Australian is to the European appears in Vigors and Horsfield's observation that they could not distinguish the solitary specimen from Australia from European birds.

Hartert, on his own saying, the most fitted to judge the Falcons, has contributed some Notes on Falcons to the *Nov. Zool.*, Vol. XXII., pp. 167-185, June, 1915. His results are expressed thus:

"*Falco peregrinus peregrinus* Tunstall.

Europe from North Sweden and North Russia at least to the Pyrenees, Alps, and Italy, Bulgaria, Bosnia, Montenegro, Albania and Rumania.

Falco peregrinus calidus Latham.

West Siberia and perhaps even in the Kirghize Steppes (where in any case it occurs as a migrant), and reaches eastward to Kamtschatka. Its migrations are enormous . . . migrates regularly to India . . . Moluccas, New Guinea, Japan and China.

Falco peregrinus anatum Bonaparte.

North America: in winter South America.

Falco peregrinus brookei Sharpe.

Spain, the northern peninsula of Marocco, Corsica, Sardinia.

Falco peregrinus pelegrinoides Temminck.

Eastern Canary Islands, middle and southern Marocco, Algeria, Tunisia, Egypt and Nubia.

Falco peregrinus babylonicus Sclater.

Turkestan to the desert of Gobi, to Mesopotamia, Persia and Baluchistan: in winter North-west India.

Falco peregrinus minor Schlegel.

In tropical Africa, north to Fazogli on the Blue Nile, and South Africa.

Falco peregrinus radama Hartlaub.

Madagascar.

Falco peregrinus peregrinator Sundevall.

Forests of India, east to South China.

Falco peregrinus ernesti Sharpe.

Greater Sunda Islands, the Philippines, and New Guinea.

Falco peregrinus macropus Swainson.

Australia and Tasmania.

Falco peregrinus pealei Ridgway.

Pacific Coast region of North America; ? Japan.

Falco peregrinus cassini Sharpe.

Southern South America.

Falco peregrinus riphœus Buturlin.

Southern Ural Mountains.

Falco fasciinucha Reichenow and Neumann.

Ndara, Terta, Africa."

I do not propose to criticise this in detail, but I may suggest that it appears to be a review of the members of the group *Rhynchodon*, and as a consequence of avoiding the unnecessary burden of *Rhynchodon* we must continually repeat "*Falco peregrinus.*" This would be a small matter were it not that this usage of trinomials hides facts which would otherwise stand out. Thus *Rhynchodon ernesti* would call attention to the fact that something here was of more interest and that a form differing considerably from *Rhynchodon* *peregrinus macropus* was intended. I do not state that *ernesti* is a distinct species, but I note that under *Falco peregrinus pelegrinoides* Temm. Hartert has written: "One might be in doubt if this Falcon should be treated as a subspecies of the Peregrine, or as a distinct species, but I have no doubt that—from my point of view—the former course is the right one. I am glad to say I agree in this with Neumann, Kleinschmidt, and many others." I am familiar with Neumann's views on subspecies from conversation and I have an idea of Kleinschmidt's from his writings, so that I should conclude *Rhynchodon pelegrinoides* Temminck was a distinct species. It may not be. Hartert may be very familiar with Palæarctic Peregrines, but he does not write acceptably of Australasian birds. Thus, under *Falco peregrinus ernesti* Sharpe, he observes: "Birds from Java are either *F. p. calidus* in winter quarters, or *ernesti*, but certainly not *melanogenys*. Peregrines have been collected on the Fiji Islands, in New Caledonia, and on the New Hebrides. If they were resident on those groups, a series of adult birds would perhaps show them to differ from their allies, but they are more likely only stragglers of *melanogenys* or maybe of *ernesti*: young birds are very dark."

However Dr. Hartert expects *melanogenys* to straggle to Fiji since it is confined otherwise to Australia I do not understand. I believe young birds have been collected in those Islands. That really does not concern me much, but Dr. Hartert's remarks under the name *Falco peregrinus macropus* Swainson do.

I quote Dr. Hartert's notes and give my replies:

"*Falco melanogenys* Gould, *Synops. B. Austral.*, pt. III., pl. 42 and text, April, 1838—'Australia generally.' Mathews, *List B. Australia*, p. 111, says, 'Tasmania,' but Gould says distinctly 'Australia generally,' and also in the contemporary description in *Proc. Zool. Soc.* (London), part V., 1837, p. 139, published in December, 1838, he says, 'Hab. per totam Australiam.' Mr. Mathews can therefore not say 'Tasmania.' If, in some way, he has found out that Gould's type—though he probably had a number of specimens from various parts of Australia—came from Tasmania, he must quote 'Australia generally,' which is erroneous, as Gould had only one skin from Tasmania, as shown in such and such a way."

Such a paragraph is entirely superfluous and only reveals the superficial review of the literature made by even such authorities as Dr. Hartert when dealing with Australian birds. Had Dr. Hartert made only a little search into recent work on Australian birds he must assuredly have noted a paper by Witmer Stone entitled, "A List of the Species of Australian Birds described by John Gould, with the location of the Type Specimens." This valuable list appeared in the *Austral Avian Record*, Vol. I., pp. 129-180, Feb. 28, 1913, which Journal is in the Tring library and contains quite a lot of interest to the student of Australian, and also extra-limital, birds. Furthermore, even if Dr. Hartert omitted to glance over this periodical, the paper was noted and reviewed in the *Ibis*, the *Auk*, and the *Emu*, so that it should not have altogether escaped Dr. Hartert's notice. In my "Reference List" I selected New South Wales, but Witmer Stone found that the bird described was labelled "Tasmania." I do not think it necessary to add all that information in a mere List, and Dr. Hartert's own method does not leave us much wiser. He does not write the details he states I should have given, but merely "Habitat in Europe. Restricted typical locality: S. Sweden," to cite the first instance turned up.

Dr. Hartert then continues: "I must say that I am not thoroughly convinced that Swainson's description is that of a Peregrine." He then quotes that in full and adds: "Is this undoubtedly the Australian Peregrine? If so, the name *macropus* must replace the well-known *melanogenys*, as Mr. Mathews discovered that Swainson's work appeared three months before that of Gould. 'Unfortunate discovery,' the late P. L. Sclater would have said."

Dr. Hartert unfortunately does not emphasize the points in which Swainson's diagnosis is at fault. I have compared the description with specimens, and though it is not perfect it agrees well, and Gould, who probably examined the specimen at the time, immediately wrote it as a synonym of his name, and G. R. Gray also accepted the synonymy, even publishing it before Gould.

Dr. Hartert added further: "Mr. Mathews (*Austral Avian Record*, Vol. I., p. 33) separated another Australian Falcon under the name of *Falco peregrinus submelanogenys*. His diagnosis is: 'Differs from *F. p. melanogenys* in its much more rufous under-surface and larger size. Type South-west Australia No. 4489.' Such a diagnosis is next to useless: nothing is said about the dimensions, nothing of the number of specimens compared, whether they were adult or not. Had Mr. Mathews been acquainted with the colour-variations of all forms of Peregrine Falcons he would probably not have created this new name. We should have been thankful for fuller details, which appear to be indispensable in such a difficult case."

Here Dr. Hartert has made more just comments, but again the variation of birds under Palæarctic conditions has nothing whatever to do with the variation of birds in Australia. Dr. Hartert continually fails to recognise that Australia is more extensive than Great Britain, and whatever its extent the climatic conditions are immensely more complex. Further, he has never recognised the complexity of the Avifaunal elements and the inapplicability of the results of Northern study alone. In the present case the variation seen in the Western bird, which is here fully described and figured, is not seen in those from East Australia, which are moreover "larger" not "smaller." The former word was written instead of reversing it and writing the latter, when translating my notes to paper. Since then I have seen many more Eastern specimens and am not sorry that I created the new name, as I have still to meet with a similar bird from the East. Under these circumstances the name must be maintained, notwithstanding Dr. Hartert's criticism.

I still admit

Rhynchodon peregrinus macropus Swainson.
East Australia.
Rhynchodon peregrinus submelanogenys Mathews.
West Australia.

The following note by Mr. Tom Carter refers to the Western form: "The Black-cheeked Falcon occurs sparingly in the South-west. On November 18th, 1910, Mr. J. Russell said he saw a nest with young birds in a large Jate tree at the Pallenup River, S.E. from Broome Hill, and he watched the old bird feeding them. In the dense Marlock thickets that occur in that neighbourhood the Leipoa is still fairly abundant, and some of them are occasionally killed by these Falcons. Mr. Russell told me that the young birds mentioned above left the nest on December 12, 1910, and were being fed by one of the parents. I have a skin of an adult ♂ shot on the Pallenup River on June 18, 1910."

I have indicated above that Latham did not give a name to the Watling Drawing, but I find that in the *General History of Birds*, Vol. I., p. 228, 1821, he did describe it under the name "Bird Hawk," as follows:

"Length 14 or 15 inches; the general make rather stout. Bill lead-colour; cere yellowish; top of the head and sides below the eyes black, giving the appearance of a hood; the black continues on the nape and all the under-parts of the body, but inclines to blue on the back and wing-coverts, where the middle of the feathers is marked with black; chin and throat white with a few dusky streaks, but from the breast the whole of the under-parts crossed with the numerous slender dusky bars, almost touching each other; tail marked with seven or eight pale ones on the inner webs, appearing beneath; shafts white; wings long, reaching to the end of the tail; legs pale yellow.

"Inhabits New South Wales; said to live on small birds, fish and reptiles."

GENUS—NOTOFALCO.

NOTOFALCO Mathews, Austral Avian Record, Vol. II., p. 56, 1913 .. .. Type *N. subniger.*

AT the place quoted I differentiated this genus thus: "Differs from *Rhynchodon* Nitzsch in its much longer wings, longer tail, and weaker feet."

This decision was arrived at after examination of specimens, when I could not exactly match this form with any of the known divisions of *Falco.*

Recourse to literature showed that it had been placed in *Gennaia* and *Hierofalco*, always with *Falco hypoleucus.* It certainly did not group with the last-named, nor to me with *Gennaia* or *Hierofalco.*

Large Falconine bird with large hooked bill, toothed on the edges of both mandibles, long wings, long tail, strong legs and feet.

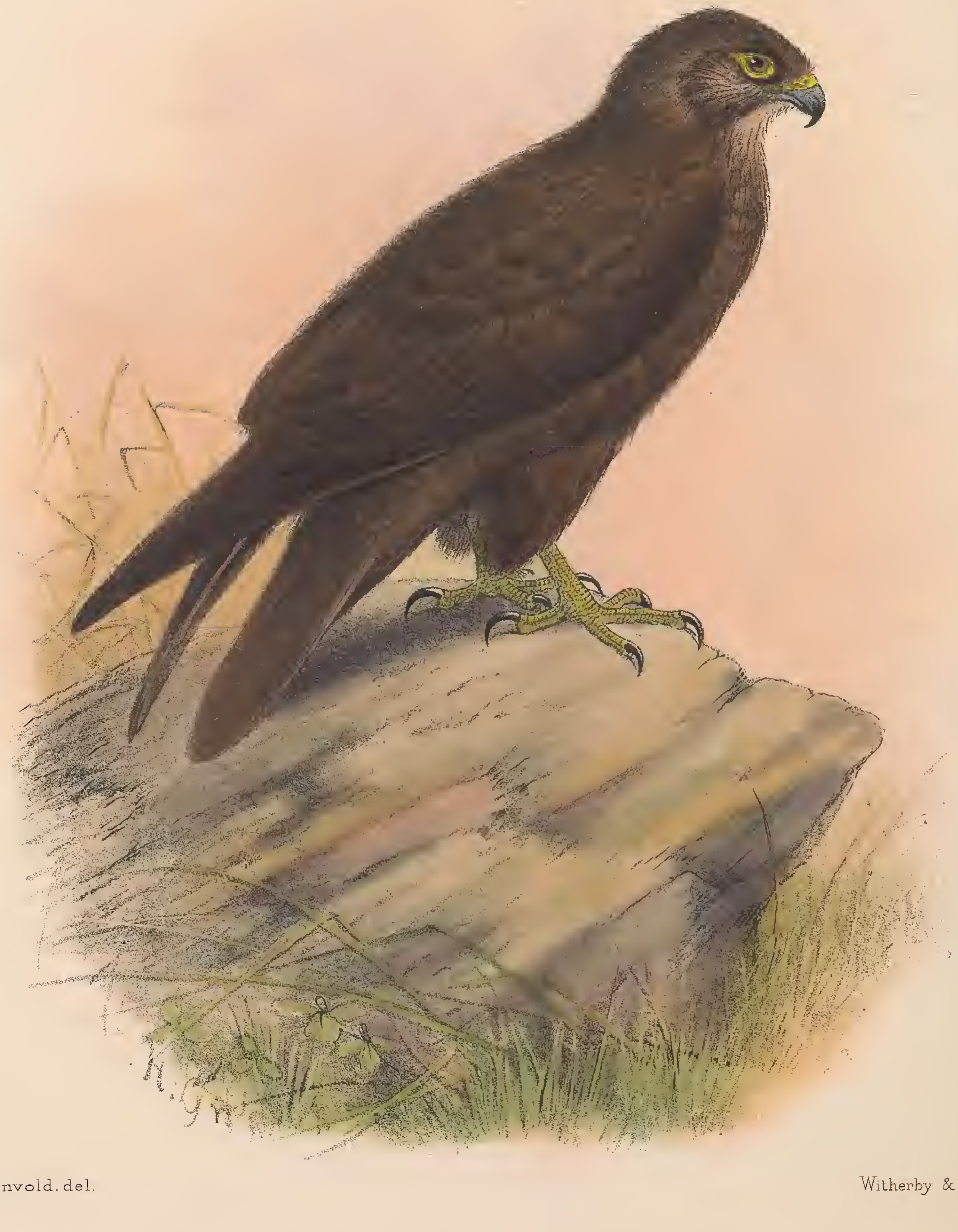
The wing has the second primary longest, the third longer than the first, which, however, much exceeds the fourth.

The tail is square, very long, almost two-thirds the length of the wing.

The middle toe is not especially lengthened, being noticeably less than the tarsus. All the other large Falcons disagree: thus *Rhynchodon* has long middle toe and *Hierofalco* has a shorter tail at sight.

It is at the present time superficially unlike all other large Falcons.

Gurney placed it with *Gennaia,* which is a Falcon intermediate between *Falco* and *Rhynchodon,* with long middle toe.



H. Grönvold. del. Witherby & Cº

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NOTOFALCO SUBNIGER.

(BLACK FALCON).

Order FALCONIFORMES *Family FALCONIDÆ.*

No. 312.

NOTOFALCO SUBNIGER.

BLACK FALCON.

(PLATE 255.)

FALCO SUBNIGER Gray, Ann. Mag. Nat. Hist., Vol. XI., p. 371, 1843; Hab. unknown: I have fixed Victoria.

Falco subniger Gray, Ann. Mag. Nat. Hist., Vol. XI., p. 371, 1843; Gould, Birds Austr., Vol. I., pl. 9, 1848; Sturt, Exped. Centr. Austr., Vol. II., App., p. 14, 1849; Gould, Handb. Birds Austr., Vol. I., p. 28, 1865; Diggles, Orn. Austr., pt. IX., 1866; Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 394, 1874; *id.*, Proc. Zool. Soc. (Lond.) 1875, p. 339 (Q.); Ramsay, *ib.*, p. 579 (Q.); *id.*, Cat. Austr. Accip., p. 50, 1876; *id.*, Proc. Linn. Soc. N.S W., Vol. II., p. 177, 1878; Bennett, *ib.*, Vol. X., p. 162, 1885 (N.S.W.); Ramsay, *ib.*, Ser. II., Vol. I., 1886, p. 1142, 1887 (N.S.W.); *id.*, Tab. List Austr. Birds, p. 1, 1888; North, Austr. Mus. Cat., no. 12, p. 18, 1890; *id.*, No. 4, p. 55, 1898; Hall, Key Birds Austr., p. 3, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 33, 1901; A. G. Campbell, Emu, Vol. II., p. 11, 1902 (Vict.); Berney, *ib.*, Vol. V., p. 18, 1905 (Q.); C. F. B(elcher), *ib.*, p. 204, 1906 (Vict.); Hill, *ib.*, Vol. VI., p. 177, 1907 (Vict.); Mathews, Handl. Birds Austral., p. 42, 1908; Broadbent, Emu, Vol. IX., p. 233, 1910 (Q.); North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 269, 1912; Mathews, Nov. Zool., Vol. XVIII., p. 252, 1912; Macgillivray, Emu, Vol. XIII., p. 152, 1914 (Q.); Barnard, *ib.*, p. 206 (N.T.).

Hierofalco subniger Bonaparte, Consp. Gen. Av., Vol. I., p. 24, 1850.

Gennaia subnigra Gurney, Ibis 1882, p. 452.

Falco niger (error) Batey, Emu, Vol. VII., p. 3, 1907 (Vict.).

Notofalco subniger Mathews, List Birds Austr., p. 112, 1913; S. A. White, Trans. Roy. Soc. South Austr., Vol. XXXVIII., p. 426, 1914 (Central).

Notofalco subniger minnie Mathews, Austral Av. Rec., Vol. II., p. 127, Jan. 28th, 1915; Minnie Downs, Queensland.

Notofalco subniger subniger Mathews, *ib.*

DISTRIBUTION. Australia. *Not* Tasmania.

Adult male. General colour above and below sooty-black, with pale markings on the inner webs of the primary-quills towards the base, and pale tips to the tail-feathers; chin and ear-coverts smoky-white with dark shaft-lines; the feathers of the breast and abdomen have white bases. Bill dark indigo; feet bluish-white; eyes clear brown. Total length 500 mm.; culmen 22, wing 370, tail 220, tarsus 48. Figured. Collected on Minnie Downs, Central Queensland, on the 6th of January, 1882.

Adult female. Similar to the adult male but larger. Wing 387; culmen 22; tarsus 51. Collected on Alexandria, Northern Territory, on the 30th of April, 1906.

Very old birds have no markings on the inner webs of the primaries.

Immature have the throat and ear-coverts whiter, the tail and inner webs of the primaries with white bars; under tail-coverts, some of the under wing-coverts and the breast-feathers have large white spots. The feathers of the head, mantle and back have white bases.

Nest. The abandoned nest of another species; or built of sticks, as is usual with birds of prey.

Eggs. Clutch, three. Ground-colour buff, closely sprinkled with spots of reddish-brown and a few of purplish-brown. Axis 53-56 mm.; diameter 38-41.

Breeding-season. September to December.

Although described by G. R. Gray from a specimen from unknown locality, this fine Falcon was soon recognised as Australian and figured by Gould from South Australia. In 1865 Gould wrote: "During the long interval that has elapsed since I first figured this bird in the folio edition of the 'Birds of Australia,' no additional information has been obtained respecting this rare species of Falcon. Nothing is known of its habits, and as yet I have only seen four examples, all of which were killed in South Australia. It was observed by Captain Sturt during his expedition into the interior of that country, and he has favoured me with a note in which he says: 'This well-shaped and rapid bird was killed at the Depôt, where both male and female were procured; but it was by no means common, only two others having been seen.'"

Since then, however, it has been more commonly observed, but it is still one of the rarest Falcons, and with it must always be named Mr. K. H. Bennett, who contributed to the *Proceedings of the Linnean Society of New South Wales*, Vol. X., pp. 162-7, 1885, a long and interesting account of its habits, which must be here quoted from *Austr. Mus. Spec. Cat.*, No. 1, p. 270:

"The first thing that strikes an observer with regard to *Falco subniger* is its extraordinary swift flight, almost equalling that of *Cypselus*, and the next its powers of endurance on the wing. It is tolerably numerous at certain times, for here they are undoubtedly migratory, arriving about the beginning of September in company with *Turnix velox*, on which it preys, and departing about February. Quail, and the young of birds frequenting the plains such as *Anthus australis*, *Cinclorhamphus cruralis*, and *Ephthianura aurifrons* constitute its chief prey, for great as are the Black Falcon's powers of flight, he has more than a match in the adults of any of the above-mentioned birds, for they dodge and turn so quickly that the Falcon has no chance with them. On one occasion a 'Ground Lark' (*Anthus australis*) defied the united efforts of no less than three Falcons, the 'Lark' simply avoiding by a quick turn each Falcon's strike, but finally it fell a victim completely tired out. One peculiarity of this bird, not shared by any others of the family that I am aware of, is its habit when watching for prey of frequently ascending to such a great height as to be invisible, which shows the wonderful power of vision possessed by this bird. Many and many a time when on the plains, miles from any timber, with a flock of sheep camped, I have carefully scanned the sky overhead and around to see if a Falcon was visible, but not a speck has met my gaze if any direction. On starting to drive the sheep, and almost immediately have they disturbed a Quail, a rushing sound would be heard overhead, and on looking up a dark object would be seen descending with dreadful rapidity, and so compressed or gathered together as to render one unacquainted with the bird to say what the object was. When some thirty or forty feet from the ground the descent is arrested, and by a sudden movement and expansion of wings the Falcon assumes a horizontal attitude and the chase commences, which as a rule results in speedy capture, and the Falcon, by a series of graceful curves, again mounts into the air, devouring its prey as it ascends, an occasional tuft of blood-stained feathers slowly wafted earthwards, the same operation being repeated when the next quail or some young bird is flushed. Sometimes, however, the Falcon is baulked by the quarry suddenly dropping into some sheltering salt-bush, but rarely more than a foot or eighteen inches high. When this is the case the Falcon quickly arrests its flight, and closing its wings, by a powerful movement shoots perpendicularly into the air for some distance, and then expanding its wings, hovers for a short time over the bush in which its prey has taken refuge. Should it be a scanty one, and the unfortunate bird visible, the Falcon slowly descends, alighting on the top of the bush, and flapping its outstretched wings drives the terrified victim out, when it is speedily clutched in the talons of its remorseless foe. Should the bush prove too dense, and the bird not to be seen, the Falcon gives it up and mounts skyward again. As an instance of the sluggishness or stupidity of the Letter-winged Kite, I may mention that I one day saw a Black Falcon dash into a number of them perched on a dry Pine-tree, close to the house, and clutch one in its sharp talons; both birds fell to the ground, and after struggling for a few moments the Falcon rose heavily and flew off with its prey: the other Kites sat perfectly still all through the performance. This went on for several days, the Falcon each time securing a victim. Noticing that the Falcon's visits occurred at about the same hour daily, I determined to try and capture both the Falcon and its prey. With this object I secreted myself in some thick bushes close to the foot of the tree in which the Kites sat. I had not long to wait, for soon Falcon and Kite came struggling down within a few feet of where I was concealed, and I sprang out and caught one of the previously outstretched wings of the Falcon. So fierce was its clutch that I had difficulty in releasing the Kite, which, though severely wounded, had sufficient strength to make off. I cut the Falcon's wings and kept it in confinement for some time, but it was so fierce and untractable that I got disgusted and ended its career. I fancy these cases of one bird of prey attacking another with the intention of feasting on it are very rare; in all my wanderings I never saw but one other instance of the kind, and in that case the aggressor was a Black-cheeked Falcon (*Falco melanogenys*), and the bird attacked a Delicate Owl (*Strix delicatula*); the latter, however, after a short tussle, managed to free itself. A friend of mine, who is a keen observer, told me that he was driving a small lot of sheep, and a Black Falcon had made several ineffectual efforts to capture a 'Ground Lark' (*Anthus australis*), and while in pursuit of it some distance ahead of the sheep they disturbed a Black Duck (*Anas superciliosa*) from her nest under a cotton bush, and she flew off in the direction the Falcon had gone; the latter caught sight of her, and leaving the 'Lark' turned and made for the Duck, and so great was the concussion when they met that they fell to the ground, and my friend on riding up found both dead. A large flat-winged dipterous parasite infests the Black Falcon: it moves about sideways under the feathers with extraordinary rapidity. The Black Falcon sometimes breeds here, but not often, for during my long residence (over twenty years) in this locality I have only met with their nests on four occasions (one only a few days since). The nest I recently found was clearly a case of appropriation, as last year (1883) it was occupied by a pair of *Gypoictinia melanosternon*; the Falcons had possession, and the nest contained four eggs. Immediately beneath the edge of the nest a pair of *Xerophila leucopsis* had constructed their nest, which contained young, and the old birds were flying in and out, apparently quite unconcerned at the proximity of their dangerous neighbours, well knowing that the interstices between the large sticks of which the upper nest was composed afforded them a secure asylum."

This was reproduced by North in the *Austr. Mus. Spec. Cat.*, No. 1, when he added a further note from Mr. K. H. Bennett as follows: "On the 3rd June, 1889, while out on the run, my dog killed a rabbit, and on returning past the spot I was surprised to see a Black Falcon (*Falco subniger*) feeding on the carcass. This is most unusual, for hitherto I have never known this bird, or in fact any of the true Falcons, to feed upon anything they had not killed. It is the first example I have seen of the Black Falcon for two years. On the 31st December, 1889, whilst driving a lot of sheep, a pair of Black Falcons accompanied me for a considerable distance, attracted by the grasshoppers disturbed by the sheep. These insects they dexterously caught and devoured while on the wing, as did also a *Milvus affinis* which was attracted by them. The absence of Quail and other small birds is doubtless a cause of these species preying on insects."

A. G. Campbell, writing of the birds of North-eastern Victoria, in the *Emu*, Vol. II., p. 11, 1902, stated: "One day a Black Falcon (*F. subniger*) was observed to make a tremendous swoop for some distance in the air, and neatly pick up a sparrow about to enter a hedge."

Berney states (*Emu*, Vol. V., p. 18, 1905) that it is: "To be seen fairly frequently on the open downs hawking Quail, etc., on which occasions it will follow a horseman or a mob of driven sheep long distances for the small birds that may be flushed; some very good falconry may then be witnessed. Seldom more than two or three are seen at once, but in one instance I saw eight after an unfortunate Pipit. The Falcons are terribly swift on the wing. One of the wonders of bird-flight seems to me to be the extraordinary pace a small Falcon can obtain in a short distance when making its swoop at its quarry."

Hill (*Emu*, Vol. VI., p. 177, 1907) wrote: "A very rare visitor, seen only during the rabbit-poisoning period (N.W. Victoria)."

Under the erroneous name of *Falco niger*, Batey has written (*Emu*, Vol. VII., p. 3, 1907) from Victoria: "This Hawk seems to be widely distributed, because I have seen it on the Old Man Plain in Riverina, where on one occasion I saw it take a Quail that was flushed as I rode along. In this case the Falcon appeared to strike the quarry with his breast-bone, stunning it, then wheeling about, picked it up. The Black Falcon, unlike his grey brother, affects the plains, and if you are riding, walking, or driving stock, should a Quail rise, to your surprise a Falcon often comes from behind you like a flash. The Black Falcon was a rare bird of old in my part. Twenty years must have elapsed since one was noted; still I suppose it will be met with about Rockbank."

Macgillivray, in the *Emu*, Vol. XIII., p. 152, 1914, gave M'Lennan's notes: "Noted frequently in the Gulf Country (Queensland). 14th March, 1910: 'Saw a pair of Black Falcons examining old nests in the coolibah trees on a channel of the Gilliat, probably intending to use one of them. The birds were in splendid plumage, but too wary to admit of a close inspection.' Several other pairs were seen on the Leichhardt and Gregory Rivers, but the spring is probably their nesting-time."

In the *Emu*, Vol. V., p. 204, 1906, C. F. B(elcher) wrote from Kyabram, Victoria: "On the 20th February I shot a Black Falcon (*F. subniger*) as it was endeavouring to seize and carry away a wounded Marsh Tringa (*Heteropygia acuminata*) from the ground on a three-chain road that runs through Wyuna estate about 10 miles from here. Is this Falcon common in any part of Victoria? It is the first of its kind I have seen. Driving back we saw a little Falcon (*F. lunulatus*) dart at express speed through some dead timber, to the usual accompaniment of small birds' twittering; and nearer home, at Taripta, a Black-cheeked Falcon (*F. melanogenys*) flew out of a box-tree alongside the road. Its flight was slow for a Falcon, and yet the wings seemed to beat quickly. This is not a great place for Hawks, and to see three kinds of Falcon in one day is for me at least a 'local record.'"

Captain S. A. White has noted: "The Black Falcon is seldom if ever seen down South, and in the North it is rare to see more than a pair in the same district, or this has been my experience. They are birds of most graceful flight and will soar on outstretched wings for hours with hardly a noticeable movement in their wings: their dark plumage makes them very conspicuous."

During his expedition into the Interior of Australia he only noted one specimen while they were ascending Ellery Creek.

Ramsay recorded that J. B. White, Esq., of Springsure, Queensland, presented him with a specimen, and one was forwarded at the same time by Mr. White to the British Museum.

This bird is still so rare in collections that no subspecies have been named. Though North wrote: "Mr. G. A. Keartland . . . has also noted it breeding near Lake Way in Western Australia, and the vicinity of the Fitzroy River in North-western Australia," he added: "I have never handled or seen a specimen from the western portion of the continent." He then reproduced Keartland's notes which read: "My first specimen of the Black Falcon (*Falco subniger*) was shot many years ago at Heidelberg. It is occasionally seen near Melbourne and at Bacchus Marsh. In Central Australia these birds frequent the rocky gorges of the MacDonnell Range where they prey upon the small marsupials and reptiles so common in the spinifex. They are very wild and swift in their movements. Their nests are similar to those of *Hieracidea berigora*. In July, 1896, during the journey of the Calvert Expedition, I saw a nest of this species in a Cork-bark tree, near Lake Way, Western Australia, containing a young bird, and in January, 1897, several others were noted in the tall *Eucalypti* near the Fitzroy River, North-western Australia."

The bird from Queensland that I differentiated as a subspecies I now consider to be identical with the type of *subniger*.

GENUS—IERACIDEA.

IERACIDEA Gould, Synops. Birds Austr., pt. III., pl. 43,
Apl. 1838 .. .. Type *I. berigora.*

Also spelt—
Hieracidea Strickland, Annals. Mag. Nat. Hist., Vol. VI., 416, 1841.
Jeracidea Kaup, Classif. Saug. and Vögel., pp. 102, 104, 1844.
Jeracidia Bonaparte, Rev. Mag. Zool. 1854, p. 535.

MEDIUM-SIZED Falconine birds with long wings, long legs and small feet, small bills and long tail.

The bill is Falconine but weak, with a very small cere almost hidden by the feathers of the fore-head.

The wing is long with the third primary longest: the second almost equals it but is less; while though the first primary is long, it is less than the fourth.

The tail is long and rounded.

The legs are long and the feet small, the tarsus being more than one and a half times the length of the middle toe, which is not especially lengthened. The tarsus has the usual covering of reticulate scales, but they are so coarse as to resemble scutes on the front.

This genus, differentiated by Gould, has been recognised by genus-lumpers who have lumped *Cerchneis*, which is quite inconsistent, as *Cerchneis* differs just as markedly from *Falco* as *Ieracidea* does. The latter is a most peculiar Austral evolution, and superficially its nearest relation cannot be definitely determined. It is remarkable, as hereafter shown, for its coloration, a dark phase, probably comparatively recently acquired, being constantly specifically separated.

No. 313.

IERACIDEA BERIGORA.

BROWN HAWK.

(Plate 256.)*

Falco berigora Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 184, 1827; New South Wales.

Cream-bellied Falcon, Latham, Gen. Hist. Birds, Vol. I., p. 230, 1821.

Falco berigora Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 184, 1827.

Ieracidea berigora Gould, Synops. Birds Austr., pt. III., pl. 43, 1838; Gray, Genera Birds, Vol. I., p. 20, 1844; Gould, Birds Austr., Vol. I., pl. 11, 1848; Diggles, Orn. Austr., pt. VI., 1866; Hartert, Nov. Zool., Vol. XII., p. 208, 1905 (N.T.); Mathews, List Birds Austr., p. 112, 1913; S. A. White, Trans. Roy. Soc. South Austr., Vol. XXXVIII., p. 426, 1914 (Central).

Ieracidea occidentalis Gould, Proc. Zool. Soc. (Lond.) 1844, p. 105, 1845 (West Australia); *id.*, Birds Austr., Vol. I., pl. 12, 1848; Witmer Stone, Austral Av. Rec., Vol. I., p. 146, 1913.

Falco berigora orientalis Schlegel, Naumannia 1855, p. 254 (*nom. nud.*).

Hieracidea berigora Gould, Handb. Birds Austr., Vol. I., p. 31, 1865; Diggles, Orn. Austr., pt. VI., 1866 (Q.); Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 421, 1874; Ramsay, Cat. Austr. Accip., p. 55, 1876; *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 177, 1878; Masters, *ib.*, p. 269, 1878; Gurney, List Diurn. Birds of Prey, p. 96, 1884; Ramsay, Proc. Linn. Soc. N.S.W., Ser. II., Vol. I., 1886, p. 1086, 1887 (N.W.A.); *id.*, *ib.*, Vol. II., p. 166, 1887 (N.W.A.); Ramsay, Tab. List Austr. Birds, p. 1, 1888; North, Austr. Mus. Cat., no. 12, p. 21, 1890; *id.*, *ib.*, no. 4, p. 61, 1898; Hall, Key Birds Austr., p. 3, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 36, 1901; Hall, Emu, Vol. II., p. 63, 1902 (N.W.A.); Milligan, *ib.*, p. 70 (S.W.A.); A. G. Campbell, *ib.*, p. 205, 1903 (King I.); Carter, *ib.*, Vol. III., p. 34, 1903 (N.W.A.); Lawson, *ib.*, Vol. IV., p. 133, 1905 (W.A.); Berney, *ib.*, Vol. V., p. 18, 1905 (Q.); Hill, *ib.*, Vol. VI., p. 177, 1907 (Vict.); Hall, *ib.*, Vol. VII., p. 26, 1907 (N.W.A.); Mathews, Handl. Birds Austral., p. 42, 1908; Whitlock, Emu, Vol. VIII., p. 178, 1909 (W.A.); Hall, *ib.*, Vol. IX., p. 126, 1910 (S.A.); Whitlock, *ib.*, p. 191, 1910 (W.A.); Howe, *ib.*, p. 229, 1910 (Vict.); Ogilvie-Grant, Ibis 1910, p. 168 (W.A.); North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 277, 1912; Wilson, Emu, Vol. XII., p. 31, 1912 (Vict.); S. A. White, *ib.*, p. 124, 1912 (S.A.); Mellor and White, *ib.*, p. 161, 1912 (Flinders I.); S. A. White,

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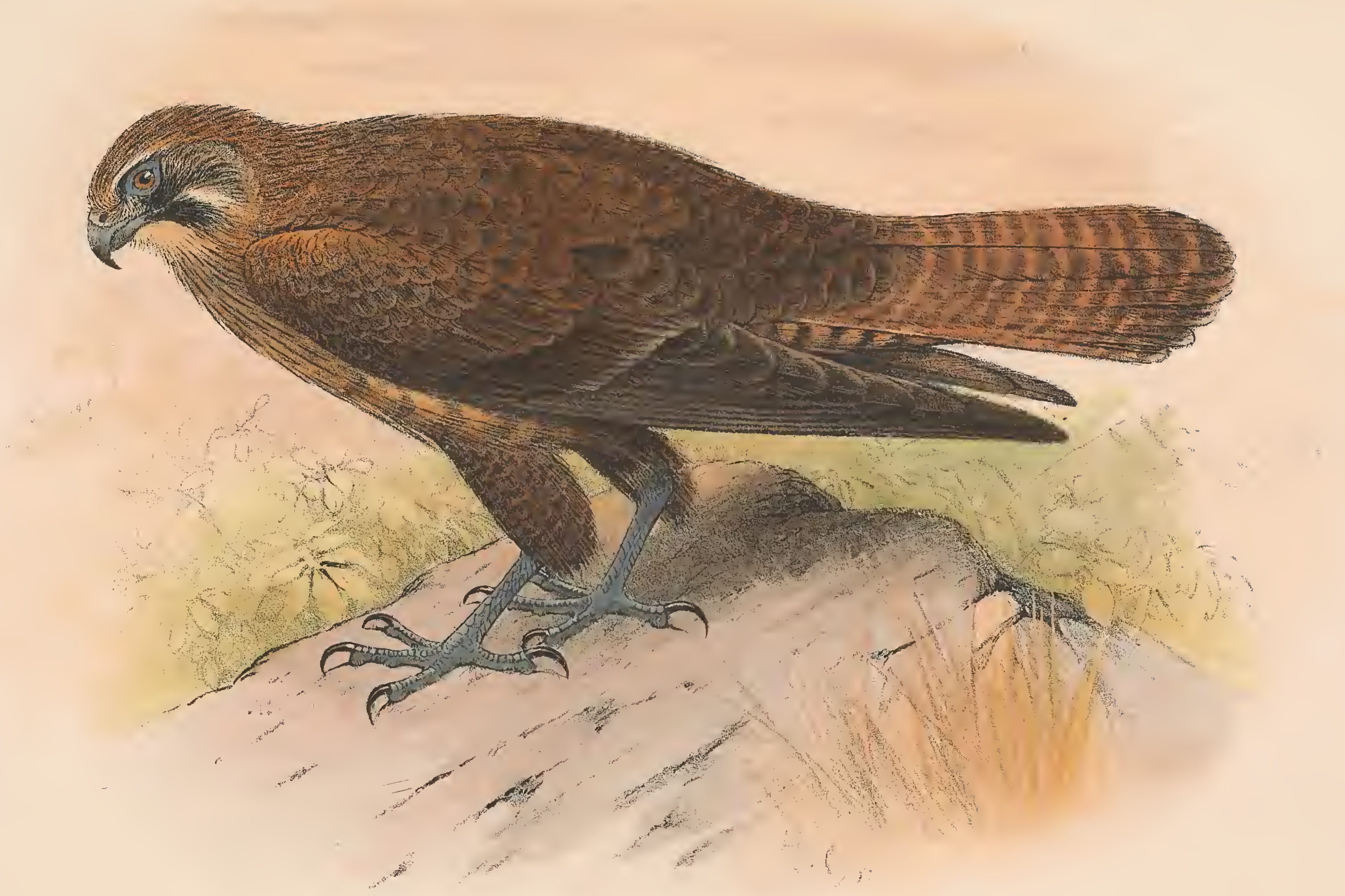
* The Plate is lettered *Ieracidea occidentalis*.



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IERACIDEA OCCIDENTALIS.

(WESTERN BROWN HAWK).

ib., Vol. XIII., p. 23, 1913 (S.A.) ; Chandler, *ib.*, p. 36, 1913 (Vict.) ; Macgillivray, *ib.*, p. 152, 1914 (Q.).

Hieracidea occidentalis Gould, Handb. Birds Austr., Vol. I., p. 33, 1865 ; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., Ser. 2, p. 166, 1887, N.W.A. ; Macgillivray, Emu, Vol. XIII., p. 152, 1914 (Q.) ; Barnard, *ib.*, p. 206, 1914 (N.T.).

Hieracidea orientalis Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 422, 1874 (I fix New South Wales) ; Ramsay, Cat. Austr. Accip., p. 57, 1876 ; *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 177, 1878 ; Gurney, List Diurn. Birds Prey, p. 96, 1884 ; Ramsay, Proc. Linn. Soc. N.S.W., Ser. II., Vol. I., 1886, p. 1086, 1887 (N.W.A.) ; Legge, Pap. Proc. Roy. Soc. Tasm. 1886, p. 237, 1887 (Tas.) ; Ramsay, Tab. List Austr. Birds, p. 1, 1888 ; *id.*, Cat. Austr. Accip. Suppl., p. 8, 1890 ; North, Austr. Mus. Cat., no. 12, p. 20, 1890 ; *id.*, *ib.*, no. 4, p. 63, 1898 ; Hall, Key Birds Austr., p. 3, 1899 ; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 37, 1901 ; A. G. Campbell, Emu, Vol. II., p. 11, 1902 (Vict.) ; Hall, *ib.*, p. 63 (N.W.A.) ; Le Souëf, *ib.*, p. 141, 1903 (N.T.) ; Hill, *ib.*, p. 161, 1903 (Vict.) ; Carter, *ib.*, Vol. III., p. 34, 1903 (N.W.A.) ; D'Ombrain, *ib.*, Vol. IV., p. 125, 1905 (Vict.) ; Berney, *ib.*, Vol. V., p. 19, 1905 (Q.) ; Hill, *ib.*, Vol. VI., p. 177, 1907 (Vict.) ; Batey, *ib.*, Vol. VII., p. 3, 1907 (Vict.) ; Austin, *ib.*, p. 28, 1907 (N.S.W.) ; Cornwall, *ib.*, p. 171, 1908 (Q.) ; Mathews, Handl. Birds Austral., p. 42, 1908 ; Whitlock, Emu, Vol. VIII., p. 178, 1909 (W.A.) ; Mathews, *ib.*, Vol. IX., p. 67, 1909 (N.W.A.) ; Crossman, *ib.*, p. 86, 1909 (W.A.) ; Whitlock, *ib.*, p. 191, 1910 (W.A.) ; Littler, Handb. Birds Tasm., p. 8, 1910 (Tas.) ; Broadbent, Emu, Vol. X., p. 233, 1910 (Q.) ; Hill, *ib.*, p. 267, 1911 (N.W.A.) ; Barnard, *ib.*, Vol. XI., p. 22, 1911 (N.Q.) ; Stone, *ib.*, Vol. XII., p. 113, 1912 (Vict.) ; North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 280, 1912.

Ieracidea orientalis Hartert, Nov. Zool., Vol. XII., p. 209, 1905 (N.T.).

Ieracidea berigora berigora Mathews, Nov. Zool., Vol. XVIII., p. 252, 1912 ; *id.*, List Birds Austr., p. 112, 1913 ; *id.*, South Austr. Ornith., Vol. II., p. 29, 1915 (N.Q.) ; White, Trans. Roy. Soc. South Austr., Vol. XXXIX., p. 744, 1915 (Central).

Ieracidea berigora occidentalis Mathews, Nov. Zool., Vol. XVIII., p. 252, 1912 ; *id.*, List Birds Austr., p. 112, 1913.

Ieracidea berigora melvillensis Mathews, Austral Av. Rec., Vol. I., p. 34, 1912 ; Melville Island ; *id.*, List Birds Austr., p. 112, 1913 ; *id.*, Ibis 1914, p. 104.

Distribution. Australia ; Tasmania. (New Guinea.)

Adult female. General colour above and below rufous-brown with pale rufous bars, spots, or mottlings to the feathers, the dark shaft-lines are more or less conspicuous, especially on the crown of the head, hind-neck and throat ; outer webs of primary-quills inclining to hoary-grey, the second and third incised on the outer webs, the first and second on the inner ones ; lower back, rump, and upper tail-coverts darker brown with narrow pale rufous edgings ; tail-feathers edged with white at the tips ; a narrow line over the eye, sides of face, and eyelids black, some of the feathers on the hinder cheeks margined with dull white ; throat buffy-white, as also the base of the feathers on the breast, abdomen, under tail-coverts, hinder aspect of thighs, and outer edge of wing ; front portion of thighs almost uniform dark brown with very slight indications of pale edgings at the tips of the feathers ;

under-surface of quills and tail pale cinnamon-buff. Bill bluish-horn; eyes light brown, bare space slate colour; feet slate. Total length 525 mm.; culmen 24, wing 393, tail 230, tarsus 75. Figured. Collected on the Dawson River, Queensland, on the 1st July, 1909.

Adult male. Similar to the adult female but smaller.

Adult male. Orientalis form. Above dark brown with blackish shaft-streaks, some of the feathers with buff edges. Tail-feathers and primaries barred. Throat, a streak below the eye and middle of under-surface white, remainder of under-surface including the thighs brown. Under-surface of primaries whitish, under wing-coverts white with large brown tips.

Immature. Agreeing in variation with adults.

Nestling. Covered with whitish down (Normanton); white down on belly, darkish on the back (Port Augusta, South Australia); buffish down (East Murchison).

I describe other birds, types of *I. b. tasmanica* (Tasmania), *I. b. kempi* (Cape York), *I. b. centralia* (Central Australia), and *I. b. melvillensis* (Melville Island) in the text hereafter.

Nest. Sometimes a deserted nest of a Raven; at others one built of sticks and lined with bark, placed in a fork in a high tree if available. Outside measurements 26 inches by 12; inside 8 inches by 4; or placed in the top of an ant hill.

Eggs. Clutch, two to four. Ground-colour buff with brownish-red blotches which vary in extent; sometimes these blotches form a zone at the larger end. The eggs vary considerably, some being almost covered, while others have only a few dots on them. Axis 53 to 57 mm.; diameter 30 to 38.

Breeding-season. June to November, or later.

Vigors and Horsfield in the *Trans. Linn. Soc.* (Lond.), Vol. XV., p. 184, 1827, described *Falco berigora* as follows: "F. rufo-brunneus, gulâ, collo, nuchâque pallidè aurantiacis, tectricibus remigibusque fusco-brunneis rufo-notatis, rectricibus cineraceo-brunneis rufo-fasciatis apice pallido. . . . β variat gulâ colloque magis albidis quam aurantiacis, rectricumque fasciis minus latis quam in specimine typico.

"The native name of this bird, which we have adopted as its specific name, is *Berigora.* It is called by the settlers *Orange-speckled Hawk.* Mr. Caley informs us that the orange marks in the plumage of this species are considerably stronger in recent specimens than in those of the Society's collection, which are much faded. The specific characters of this bird accord very closely with those of Dr. Latham's '*Cream-bellied Falcon,*' but that bird is described as having a double tooth to its bill, while ours is singly toothed, as in the genuine *Falcons.*"

Latham described the Cream-bellied Falcon in the *Gen. Hist. Birds*, Vol. I., p. 230, 1821, as follows: "Length 20 in. Bill lead-colour, the upper mandible furnished with a double notch, the under short at the end and scooped out; cere pale; round the eye bare and bluish; plumage in general, above brown, the inner second quills marked with a rufous spot on each side of the shaft, all the greater quills the same, about half way from the base; tail as the quills, the two middle feathers marked with a rufous spot on each side of the shaft; all the under-parts of the body cream colour; marked down the chin, fore-part of the neck and breast with brown streaks; belly and vent plain; thighs and sides under the wings brown; tail eight inches long, and the wings, when closed, reach nearly to the end of it; legs three inches long, greenish blue, moderately strong and scaly; claws stout. Inhabits New South Wales. In the collection of General Davies."

Mr. T. P. Austin, of Cobbora, New South Wales, has written me: "In some districts this is by far the commonest bird of prey, especially through the district of Geelong, Victoria, where it is almost impossible to go a few miles out of town without seeing a number of them (all *Hieracidea orientalis*, The Brown Hawk). To travel from Geelong to Melbourne by train one would not have to look out of the window very often to see some of them perched upon the fences, telegraph posts and wires. They appear to enjoy the more open plain country to that which is at all heavily timbered. Here they are not so plentiful, but some years they are quite common, and some seasons a fair number of them breed in the district, other seasons scarcely a bird will be seen. Only once have I known them to build a nest: they usually use an old nest of some other species, such as a Raven's, or a Whistling Eagle's; they put no lining in the nest, simply laying their eggs on the rough sticks."

Dr. Morgan observes: "*Hieracidea berigora.* I believe this is the only species of brown hawk found in South Australia. The young birds from the nest are much darker than the adults and closely resemble *H. orientalis*, but I have never seen a nesting bird in this plumage, whereas in Victoria, about Geelong, they were common enough. They are common birds in all parts of this state which I have visited. They feed upon mice, beetles, caterpillars and small birds; these latter they catch by pouncing upon them and not on the wing. Their note is a single harsh scream uttered when on the wing, generally towards evening when they are returning to their roosting-places. In the winter these birds gather in flocks—up to a hundred in number. The Jarrow plains near Laura was a favourite gathering-place and I have seen several such flocks there, flying and circling in the air, apparently in play. Amongst such a flock may be seen individuals in all stages of plumage, from almost black (as seen on the wing) to the adult light sandy colour with white striped breast. As a rule they lay their eggs in the old nest of a crow or magpie, first lining it with green leaves, but occasionally they will build a nest for themselves, as Dr. Chesney and I saw a pair building a nest in the Gawler Ranges in August, 1902. The eggs are two or three in number, usually the latter: average size of seventeen eggs 5.30 × 4.00 c.m.; largest egg 5.70 × 4.10 c.m.; smallest egg, 5.00 × 3.90 c.m. Earliest date on which I have found eggs August 11th, latest date September 16th."

Captain S. A. White states: "*Ieracidea berigora* is very abundant in South Australia, and is to be found in almost any locality. We met with these birds on several occasions during our 600 miles and more trip from Port Augusta to the Gawler Ranges and seem to be thinly dispersed through the ranges as well as the surrounding plains. On the 21st of August, 1912, we discovered the first pair nesting for this trip. They had taken possession of a crow's nest placed in a gum-tree growing in a dry watercourse and about sixty feet from the ground. A male bird was upon the nest and allowed us to walk round the tree and throw sticks and stones at the nest before being dislodged. The nest contained three eggs slightly incubated. On September 16th, 1912, found a nest in a Myall tree about fifteen feet from the ground; female sat very closely on three eggs heavily incubated. Insects play a big part in the diet of these birds, but we found small lizards to be their staple food. They are rapid of flight and utter a very harsh and discordant cry."

Reporting later on his expedition into the Interior, Capt. S. A. White (*Trans. Roy. Soc. S.A.*, Vol. 38, p. 426, 1914) wrote: "*Ieracidea berigora.* Striped Brown Hawk. This is a common bird throughout the central region; we found them nesting all through the country. Took fresh eggs in July, August, September and October, and there were young nearly ready to fly in nests observed during the same months of the year. I see no variation between this bird and those we collected west of Port Augusta. Diet seems to be chiefly lizards, insects, and an occasional small or young bird.'

Mr. Tom Carter's note is important, as under the name *Hieracidea occidentalis* he has observed: "The Brown Hawk is by far the commonest hawk in West Australia, and can be seen in any district. As to the two species *occidentalis* and *berigora*, described by Gould, I was always very doubtful respecting them, and only shot two birds that approached the description of *berigora*: this was at Point Cloates. The variation in the plumage of the birds is very great. I have a skin of an adult male shot at Broome Hill in which the whole of the under-plumage from the chin to the vent is creamy-white, the thighs only being rufous. Each feather has a narrow stripe of blackish-brown, and the color of the whole under-parts is very much like that of a Kestrel (*Cerchneis*). The usual clutch of eggs is three, occasionally four are laid, and once I found five in a nest. In the Mid-West I have noted eggs between June 28th and September 1st. On July 28th, 1893, I found three eggs laid in the broken top of a large white ant-hill at Point Cloates, without any nesting material. November 1st, 1898. I found three young in down and a rotten egg in a white gum-tree at Broome Hill, in a hollow formed where a large branch had broken off. The eggs were laid on a few gum leaves on the rotten wood, and not more than a dozen small sticks."

Hall, under the name *Hieracidea berigora,* in the *Emu,* Vol. II., p. 63, 1902, gave J. P. Rogers' note: "The Brown Hawk and Kestrel are here (Upper Livuringa, 3/1/01, North-west Australia) in great numbers, feeding upon the over-large population of well-developed grasshoppers." Under this name he catalogued an "adult male 30/6/01," and under the name *Hieracidea orientalis* "an immature male 28/8/00: an immature skin 2/7/01."

Milligan (*ib.,* p. 70), from the South-west of Australia, wrote: "*Hieracidea berigora.* These birds were fairly numerous. Evidently they had begun to build, for one passed me with a long twig. The twig was carried under, and parallel with, the body. It is locally known as the 'Chicken Hawk.' The name given it by the aborigines of the South West is 'Don Don.'"

Writing of the birds on the Pilbarra Goldfield, Whitlock, in the *Emu,* Vol. VIII., p. 178, 1909, observed: "Native name 'Carra-cal·lu.' The commonest Hawk of the Coongan district, and I again met with it on the de Grey plains. I found half a dozen nests, from which I obtained eggs. As a rule they were at a good height, but one at no greater elevation than 20 feet. Unlike the others, this nest was away from the centre of the tree and was only reached with difficulty and some risk. An interesting fact was related to me by a kangaroo-hunter on the de Grey. He told me he had several times taken the eggs of this species (and probably the next mentioned, *H. orientalis*) from cavities in the huge ant-hills which are so conspicuous on these vast plains. Three was the maximum number of eggs I found, but in several cases the female was sitting on two." He then added: "*Hieracidea orientalis*—less common than *H. berigora,* but I noticed eggs in two nests."

Again Crossman, listing the birds seen at Cumminin Station, West Australia, includes (*Emu,* Vol. IX., p. 86, 1909) both *H. orientalis* and *H. berigora,* writing in connection with the first-named: "Both this and the next species are plentiful. The Brown Hawk is not above feeding on carrion, as on two occasions I have found one dead near a poisoned lamb. It is curious to see the male and female differing so much in coloration as do Brown Hawks. They are a source of great loss in the poultry-yard."

Whitlock, of East Murchison West Australian birds, in the *Emu,* Vol. IX., p. 191, 1910, wrote: "*Hieracidea berigora.* Not so common as the following, but where I found one there I found the other. This species does not seem to choose the large eucalypts to breed in, but prefers a tree in a more open situation. I took typical eggs at Bore Well, and again near Milly Pool. The latter nest was in a solitary and stunted flooded gum growing in the centre of an extensive and open plain.

"*Hieracidea orientalis.* More common than the preceding species. The large, dark females, standing sentinel-like on some dead tree or bush were a familiar sight. . . . Young in down are fawn coloured."

Hill, giving field-notes on "Birds of Kimberley," North-west Australia (*Emu*, Vol. X., p. 267, 1911), only included *Hieracidea orientalis*, calling it the Western Brown Hawk and writing: "A few birds remained in the district throughout the year, but one nest only was found, from which broods were reared in October and November. During March, April and May, when grass fires were burning in all directions, these Hawks became numerous. The crops of those examined contained lizards and large insects (*Mantidæ* and *Phasmidæ*) only."

Further, Orton and Sandland (*Emu*, Vol. XIII., p. 77, 1913) record both species from Moora, West Australia.

Macgillivray has published M'Lennan's notes in the *Emu*, Vol. XIII., p. 152, as follows: "*Hieracidea berigora.* Seen on many occasions in the Gulf country and at Cape York, where the following note was made. 11th August, 1911. When burning off all the pockets the fires attracted a number of Brown Hawks and Australian Goshawks.

"*Hieracidea occidentalis.* Noted at Corella Creek and on the Leichhardt. 10th July, 1910. On the Leichhardt River, 2 miles from Augustus, shot a light brown Hawk. Saw a pair of these birds in a tree with a nest in it just ready for eggs. 7th July, 1910. On Leichhardt River saw a Black Falcon fly into a tree with a nest in it. Watched it for some time, but it did not go to the nest, so left it till later. Went down creek to where I had seen the Black Falcon. Flushed a bird from the nest and climbed to it: it contained two eggs. I did not take them. A pair of Black Falcons was flying round the tree while I was at the nest. 11th July, 1910. Went down to creek where I had seen the Black Falcons about a nest. Flushed a light brown Hawk from the nest, which still contained two eggs."

When Ramsay reported upon Mr. Cairn's Collection from Derby, North-western Australia (*Proc. Linn. Soc. N.S.W.*, Ser. II., Vol. I., 1886, p. 1086, 1887), he included both species thus: "*Hieracidea orientalis* Schlegel. *Hieracidea berigora* Vig. & Horsf. Specimens of these birds, which are both smaller individuals than those from the eastern and southern parts of the Continent, seem to prove that they may be one and the same species; one specimen has a pale, almost white, breast, and a remarkably rufous upper-surface."

North, in the *Austr. Mus. Spec. Cat.*, No. 1, Vol. III., p. 279, 1912, gives Dr. Macgillivray's conclusion from Broken Hill, South-western New South Wales: "The lighter Brown Hawk (*Hieracidea berigora*) appears to shade into the other species, *H. orientalis.* Several nests have been found, but are indistinguishable from those of the common bird. It occurs, I should think, in about the proportion of one to two hundred of the other, and its habits and general economy are the same."

A. G. Campbell, in the *Emu*, Vol. II., p. 205, 1903, under the name *Hieracidea berigora,* gave this note: "A trait exhibited by this species on King Island shows that there is no fear of man, induced when in undisturbed retreats. A brooding bird did not leave her nest, although four *Melithrepti* were shot from the leafy tops of the tree in which it was placed. During the journey across Bass Strait one of these Hawks was noticed following the steamer. It appeared to have been on the wing for some time, and was flying heavily. On endeavouring to perch on the taff-rail of the boat, a strong gust of wind swept it into the water, where the poor thing was left to its fate."

Berney, writing of *Hieracidea berigora* in the Richmond District, North Queensland (*Emu*, Vol. V., p. 18, 1905), notes: "Is one of the commonest Hawks we have, and at the same time the most foolishly confiding. Perched on the upper limb of a dead tree, it will allow a close inspection to be made by anyone walking round just below, and screwing its head round as it follows your movements. General food appears to be grasshoppers, centipedes, lizards, *et hoc genus omne.* I never saw them tackle a live bird, though on one occasion I did see one after a Native Hen (*Tribonyx ventralis*) on a claypan flat where there was no shelter for the *Tribonyx.* If it wanted to catch the latter it was making a very poor show, but if, on the other hand, it was only having a 'lark,' then it was frightening the life out of the fowl. Of this and the succeeding species (*Hieracidea orientalis*) it is hard to say which is the more numerous here. I am inclined to say the present bird is, although supposed to be the more Western form. A nest that I inspected 12th November, 1902, contained a single chick. They are at times very much more numerous than at others, but this, I think, is due to the sort of season we are having: to the scarcity or abundance of certain food."

Hill, from the North-west of Victoria (*Emu*, Vol. VI., p. 177, 1907), wrote: "Only one specimen was identified, though no doubt the apparent scarcity may be due to the fact that for some years I believed that there was only one species of this genus in the locality."

Mr. G. A. Keartland's notes given by North in the *Austr. Mus. Spec. Cat.*, No. 1, read: "The Brown Hawk (*Hieracidea orientalis*) is scattered over the whole of Australia; I have seen it from Gippsland in the south of Victoria to Kimberley in North-western Australia. When feeding their young they are very daring, and will seize Pigeons or half-grown fowls in order to satisfy the cravings of their brood. I once saw one seize a Pigeon which was feeding in front of the Melbourne Town Hall, and after carrying its prey on to a ledge of the clock tower, proceeded to consume it in view of a large crowd of people who had witnessed the capture. These birds occasionally build their own nest, but more frequently utilise a deserted Crow's nest. Near Melbourne I have found their eggs during October and November. I took a set of Crows' eggs from a nest in a *Casuarina* on 6th November, 1893, at Werribee, Victoria, and fourteen days later found three slightly incubated eggs of the Brown Hawk in the same nest. On visiting the same nest a fortnight later, I found the Crows had resumed possession and laid three eggs. In Western Australia a pair of these birds were busy feeding three young, in a tall tree near our camp towards the end of July. Before daybreak the screams of the Hawks were heard as they passed over the camp to and from the nest, and although they worked incessantly until long after dark, the young ones were always hungry if the noise they made was an indication of the state of their appetites. During January, 1897, they were breeding at the Fitzroy River, Kimberley. They are fond of game, especially Quail, and if the grass happens to be set on fire by the natives, these birds immediately come to capture the lizards, mice or jerboas disturbed, and dashing through the smoke picked up a victim."

Berney records *Hieracidea orientalis* from the Richmond District, North Queensland (*Emu*, Vol. V., p. 19, 1905), with the note: "The remarks made in connection with the preceding species as regards food and habits are applicable to this, except that I do not think the dark bird is so confiding, and as I have already stated, I am inclined to think that this is the less numerous of the two."

Hill wrote from the North-west of Victoria (*Emu*, Vol. VI., p. 177, 1907): "A common bird in all parts of the district, though the eggs are rarely taken, owing to the inaccessible positions selected for nesting. Unlike the Goshawks, they usually build in exposed places in isolated trees. They live principally on rabbits, and during the summer months, when rabbit-shooting becomes a part of the farm work, I have seen these birds follow a shooting-party, and even fly over the dogs when hunting in order to secure the dead rabbits."

BROWN HAWK.

Batey (*Emu*, Vol. VII., p. 3, 1907), wrote regarding Victoria: "Still a permanent [species] on the old location; nests there yet: never saw it hunting. Long since, by the side of a nest, a dead snake was seen, hung on a branch. This harmless Hawk is ruthlessly shot by excursionists from Melbourne."

When Hartert received birds from Australia he recorded (*Nov. Zool.*, Vol. XII., p. 208, 1905): "*Ieracidea berigora* (Vig. and Horsf. ♀ Nullagine, 16.IV.1901 (No. R. 155.). Breast and abdomen cinnamon rufous-brown. Patch in the middle of abdomen whitish with brown bars. . . . These three specimens have the general colour above rufous and the thighs rufous, and belong thus to the form called *berigora* in *Cat. Birds*, I., p. 421 (*occidentalis* Gould). I doubt whether they are specifically or subspecifically different, but cannot prove the contrary yet.

"*Ieracidea orientalis* Sharpe. 1 ♂ 2 ♀♀. South Alligator River. These birds are above dark brown, and have brown thighs, and belong to the birds for which Dr. Sharpe adopted the name *orientalis*. A specimen from the Fitzroy River, North-west Australia, received from Mr. Robert Hall, is below like this dark bird, but above decidedly rufous! I appeal to the Australian field-naturalists to study these birds, and to collect series of paired adult birds and their young, in order to find out if they are mere aberrations (so-called 'phases') or species. They do not seem to be geographical representatives (subspecies), and I doubt whether they are species."

A note relative to the Tasmanian bird may be here quoted from North's *Austr. Mus. Spec. Cat.*, No. 1, Vol. III., p. 283, 1912: "Dr. Lonsdale Holden stated . . . these birds are common: their note is a harsh cry not unlike a Black-cheeked Falcon's, but they are not so constantly noisy as that bird. . . . On the 22nd November, 1904, on the hill side above Wentworth, Bellerive, Mr. Harrison climbed to a nest in the top of a tall Gum-tree, about one hundred and twenty feet from the ground, and what we thought was a Crow's nest, but on his nearing it out flew two half-fledged young Brown Hawks, and a third remained in the nest. The young birds scrambled into concealment when they had fluttered to earth; at any rate we could only find one of them after a prolonged search, though the ground was by no means thickly covered with herbage and bushes. The one caught still had much down on the head and back, but the markings on what feathers had grown plainly show it to be *Hieracidea orientalis*. We saw nothing of the old birds."

I noted in the *Ibis*, 1914, p. 109, that my collector, Mr. J. P. Rogers, noticed that, to his eyes, the birds collected on Melville Island differed from those seen (and obtained) in North-west Australia. I agreed and differentiated the Island form, and shall hereafter discuss fully the phases and distribution of this Hawk. From a criticism of the preceding notes it will easily be gathered that a peculiar and wonderful confusion is present, the variation in coloration being sometimes attributed to locality, others to sexual changes and sometimes to plumage conditions.

The latest discussion of these birds appears in the *Austr. Mus. Spec. Cat.*, No. 1, Vol. III., p. 278, June 26, 1912, where North deliberated thus: "Whether there are one or two species of 'Brown' Hawk inhabiting Australia has long puzzled Ornithologists. Gould held the opinion that there were two species, one inhabiting the eastern, the other the western portion of the continent, inosculating in South Australia, and certainly specimens may be found agreeing very well with the two birds represented in his folio edition of the 'Birds of Australia' under the names of *Ieracidea berigora* and *I. occidentalis.* In the *Catalogue of the Birds in the British Museum,* Vol. I., p. 421, 1874, the late Dr. R. B. Sharpe shares Gould's opinion, and in describing *Hieracidea berigora* remarks: 'The possession by the Museum of the original types of *Hieracidea berigora,* which were received from the Linnean Society, enables me to prove that the *Hieracidea occidentalis* of Gould is the true *H. berigora.* Both these species are very distinct, one from the other, in their adult and in their young plumages.' . . . Dr. Sharpe proving that Gould's *H. occidentalis* is the true *H. berigora* does away with the latter's idea that one was representative of the other on opposite sides of the continent. In the 'Report of the Expedition to Bellenden-Ker Range' (p. 84, 1888), North-eastern Queensland, Mr. C. W. De Vis, M.A., remarks as follows under 'Birds of which specimens were obtained'—*Hieracidea berigora* Vigors and Horsfield, the Brown Hawk; I find no constant difference of colouring, and no real distinction of locality between this and the so-called Eastern Brown Hawk, *H. orientalis* Schlegel. Birds with the colouring of each, and intermediate grades thereof, occur all over Queensland, and during the expedition were seen in company on the Mulgrave Plains; the name *H. orientalis,* applied to our Queensland bird, should therefore be allowed to lapse.' With a series of over thirty specimens from different parts of the continent and Tasmania, it would have much simplified my labours to have picked out examples agreeing with both of those described and figured forms, and referred to them as distinct species, but one cannot shut one's eyes to the fact that intermediate forms occur containing the characters of both, and that light and dark forms occur in the same locality and may be met with together. There is, however, a greater preponderance of adult birds with the dark brown upper-parts with the feathers more or less margined with rufous, and the under-parts brown, with the throat, fore-neck and centre of the breast more or less pale creamy-buff, and in some mottled with brown or rufous and brown, and certainly in these stages of plumage they have been found breeding. . . . Of course it does not follow that finding rufous and brown birds in company signify they are one and the same species, for how frequently are *Elanus axillaris* and *E. scriptus* found together; but one cannot get away from the fact that intermediate forms occur, and they are certainly not the immature or young stage of *Hieracidea orientalis.* We have in the Australian Museum Collection specimens of the latter, from the nestling to the adult, but not the young stage of *H. berigora.* I, therefore, intend at present to keep the two separate, although I may not be correct in doing so. Look at the difference between a light and dark specimen of *Nisaetus morphnoides*: on the other hand, I have never seen a typical *Hieracidea berigora* that is sandy-brown above and almost pure white below that was obtained in Tasmania."

It will be useful, after studying this account, to revert to Gould's account, which I here quote for comparison: "This species (the Brown Hawk, *Hieracidea berigora* of Gould) is universally distributed over New South Wales and Tasmania, and is represented in Western and North-western Australia by a nearly allied species, to which I have given the name of *H. occidentalis.* In its disposition it is neither so bold nor so daring as the typical Falcons, but resembles in many of its habits and actions the Kestrels. Although it sometimes captures and preys upon birds and small quadrupeds, its principal food consists of carrion, reptiles, and insects: the crops of several that I dissected were literally crammed with the latter kind of food. It is generally met with in pairs; but at those seasons when hordes of caterpillars infest the newly-sprung herbage, it congregates in flocks of many hundreds—a fact I myself witnessed during the spring of 1840, when the downs near Yarrundi, on the Upper Hunter, were infested in this way to such an extent as to spread destruction throughout the entire district. By the settlers this bird is considered one of the pests of the country; but it was clear to me whatever injury it may inflict by now and then pilfering the newly-hatched chickens from the poultry-yard is simply compensated for by the havoc it commits among the countless myriads of the destructive caterpillar. To give an idea of the numbers of this bird to be met with at one time, I may state that I have frequently seen from ten to forty on a single tree, so sluggish and indisposed to fly that any number of specimens might have been secured. So much difference occurs in the plumage of the *H. berigora* that the changes it undergoes require to be closely studied. Professor Kaup considers it and the next species to be identical, but having had numerous opportunities of observing both birds in a state of nature, I regard them as distinct; and in confirmation of this opinion I may state that the present bird, which is from the eastern coast, is always the largest, has the cere blue-grey, and the plumage of the adult light brown, sparingly blotched with white on the breast; while the *H. occidentalis* of the western coast is a more delicately formed bird, has the cere yellow and the breast white, with faint lines of brown down the centre of each other. . . . The *Hieracidea occidentalis,* which is very generally spread over Western and Southern Australia, loves to dwell in swampy places, where it may at all times find an abundant supply of lizards, frogs and newts, to which are added young birds, insects, caterpillars and carrion. As its small legs, compact body, and lengthened pointed wings would indicate, it flies with ease, making long sweeps and beautiful curves, which are often performed near the ground. The smaller size of this bird renders it a somewhat less formidable enemy to the denizens of the farm-yard than the Brown Hawk; still, considerable vigilance on the part of the stockkeepers is necessary to check its depredations among the broods of poultry, ducks, etc."

Gould's disposition was admitted until 1874, when in the *Catalogue of the Birds in the British Museum*, Vol. I., Sharpe indicated a supposed error, stating that the type of *H. berigora* was the same as Gould's *H. occidentalis* and taking up Schlegel's name of *orientalis* for the commoner bird. It has not been recognised that Sharpe referred to Gould's pictures only, or he would not have written what he did as quoted by North and noted above. I here contrast Sharpe's description of the type of *berigora* with Gould's description of his *berigora*, and it will be seen they are equivalent.

Sharpe.	Gould.
Upper-surface sandy-brown, strongly inclining to rufous, with which colour most of the feathers are edged, excepting the scapulars and inner secondaries, where the margins incline to fulvous.	Centre of the back reddish-brown, scapularies and wing-coverts brown, crossed with conspicuous bars and spots of ferruginous.
Head a little lighter than the back, with blackish shaft-stripes.	Crown of the head ferruginous-brown, with a fine black line down the centre of each feather.
Under-surface of the body creamy-white, with brownish shaft-stripes.	Throat, chest, centre of the abdomen, and under tail-coverts pale buff, with a fine line of brown down each side of the feather.

SHARPE.	GOULD.
Thighs chestnut.	Thighs dark brown, crossed with spots of reddish-buff.
Tail brown, tipped with white and barred with rufous.	Tail brown, crossed with ferruginous bars and tipped with light brown.

The small differences seen in the above descriptions would be easily referable to the personal equation, especially in dealing with such a bird as the present one. Sharpe used as his decisive factor in determining the two "species" the coloration of the thighs, which is at the present time obviously seen to be valueless. He neglected Gould's repeated assertion about the smaller size of the Western bird and apparently laid a great deal of weight upon the fact that Gould considered the uniform bird the adult of the bird above described. Further, he omitted to take into consideration the undoubted fact that the type of *F. berigora* came from New South Wales.

However, Sharpe described the very distinct brown bird under the name *H. orientalis*, a nomen nudum of Schlegel, and of course his determination, as an authority, carried weight and his nomination was accepted. It should be recorded, however, the practical Ramsay took care to note his experience disagreed by quoting Sharpe's detailed diagnosis of his two species in full, and adding a note: "I have here given Mr. Sharpe's descriptions, as they have in all probability been taken from the type specimens, or from others carefully compared with the types of this species, for although I have examined a large series of both adults and young of both sexes from various parts of Australia, widely separated, I cannot find any which coincide either with Mr. Gould's description of the adults or with that given by Mr. Sharpe in the British Museum Catalogue, neither of these agreeing with such birds as, until further proof to the contrary, I must consider to be the adults."

As quoted above, De Vis openly disagreed with Sharpe's conclusions, but generally these were accepted by Australian naturalists. Thus Campbell commented: "We possess two species of Brown Hawks in Australia—one frequenting the eastern part of the Continent and the other the western, but individuals often overfly their bounds or exchange localities; therefore it is not to be wondered that some of the early authors got a bit mixed in their nomenclature. The names now stand *Hieracidea orientalis* for the Brown Hawk, *H. berigora* for the Western Brown Hawk. It is rather unfortunate that '*berigora*,' which is the aboriginal name for the bird in New South Wales, should have been applied permanently to the Western species."

In the preparation of my "Reference List" I had to examine the birds in connection with the names and I came to the same conclusion as Gould, viz., the Western bird was smaller, and on the whole differently coloured, but of course only subspecifically separable. I therefore revived Gould's name, calling the Eastern bird *Ieracidea berigora berigora* V. & H. (synonym *H. orientalis* Sharpe), and the Western one *Ieracidea berigora occidentalis*, giving a note: "The differences relied upon by Sharpe for the separation of his two forms are of no value, as it will be noticed that of the three birds collected by Elsey in the Northern Territory two are referred to one form, the other to the 'very distinct' second form. Inasmuch as the Western race is recognisable, Gould's name must be accepted for it." I later separated the Melville Island form, but joined with it the Northern Australian birds and in my "List" I admitted three subspecies thus:

Ieracidea berigora berigora V. & H.
East Australia; Tasmania; South Australia.
Ieracidea berigora occidentalis Gould.
South-west Australia.
Ieracidea berigora melvillensis Mathews.
Northern Territory; North-west Australia.

I can endorse North's remarks as to the puzzling variation of these birds and it was only after a long and careful study that I could evolve a satisfactory explanation. The two forms separated by Sharpe are peculiarly distinct when odd birds are examined, but his thigh coloration is useless as a distinctive feature. The names have been so confused from Gould's name to the present, that I propose to give a rough preliminary review, using vernacular names, before my technical review. I would also mention that when my results were checked I had before me more than five times the long series North mentions he dealt with; while altogether I have examined about ten times the number North gives. Notwithstanding this apparent superfluity of specimens, many more are necessary, together with full data and field observations, before a really complete idea of this bird can be gained. I will call the birds Brown Hawk and Striped Brown Hawk, and observe that the former has typically a uniform dark brown surface above and with dark brown to black blotches, often almost uniform black below.

The Striped Brown Hawk is the one described above by Vigors and Horsfield, Gould, and Sharpe: generally more or less rufous above with darker shaft-stripes and white to creamy below, also with dark shaft-stripes. Between these two every possible variation exists. The differences are apparently not geographical at the first observation, but prolonged study showed that locality has a great deal to do with these differences.

Firstly, no Striped birds were noted from Tasmania: this was independently noted, and North has also recorded it, while Littler also accepts this fact.

Secondly, Victorian birds were all seen to belong to the Brown bird, and recourse to literature confirmed this, only a few stray references being made to the Striped form, proving, if at all, it occurred only as a straggler.

Thirdly, South Australian birds from most places, as admitted by Gould, belong to the Striped bird. West Australian birds are not peculiarly Striped ones, but both Brown and Striped ones are commonly reported together.

Fourthly. All Interior birds so far are Striped birds, and from the Northern Territory, Queensland and New South Wales, wherever access to the interior occurs, Striped birds are recognised. But, just as commonly in the three last-named places, coastal birds are recorded as Brown Hawks.

Fifthly. All Cape York birds are Brown Birds and

Finally. The species occurs in New Guinea and is separated as a subspecies, which I will later discuss, but which is a Brown Hawk.

Whether there are one or two species I cannot decide even as North concluded, but in view of the above I am only recognising one. The above results, however, need names for their expression, so that I subdivide the species into subspecies in order to emphasize the facts.

I am suggesting that the Striped form is the oldest and that the Brown Hawk is the later evolution. I have not absolute facts to prove this, but can quote the tendency of Australia to produce melanistic forms evidenced by the Wedge-tailed Eagle, the Black Falcon, and the Little Eagle. In the latter we have a case of the immature plumage apparently being retained at times.

The Striped Hawk is the Interior bird occurring in the Northern Territory, North Queensland, New South Wales, Victoria (?), South Australia and West Australia only where there is open access to the Interior.

The Brown Hawk occurs *alone* at Cape York, Tasmania and probably Victoria: on the coastal districts of Queensland, New South Wales and the Northern Territory.

As access to the coast is practically unrestricted all along the West Coast, we have a Striped Brown Hawk series; that is, a dark Brown Hawk showing stripes. The only method whereby we can show these facts is by using trinomial names for the predominant forms, and we forcibly see here the usage of subtrinomials, proposed by Meyer and Wiglesworth, indicated. Thus, however we diagnose any race, the characters given will not exclude individuals from other localities. We can therefore only frame the governing features of a series from a given locality, and under the circumstances we must utilise a name. Though this may not meet with the approval of some workers who would dismiss all names as synonyms that they with a few birds cannot recognise, it is the only practical method of dealing with a problem such as is here seen.

The first point of application is the fixation of *Falco berigora* Vigors and Horsfield, and the one fact certain is that it came from New South Wales. Though killed near the coast it is not the coastal form. The coastal New South Wales form is the one called *Hieracidea orientalis* by Sharpe.

Gould's *I. occidentalis* is the Western form resembling *I. berigora* Vigors and Horsfield, but it is smaller. We have now fixed three names to three recognisable forms, but the distribution is not so clear.

I propose to use the name

Ieracidea berigora orientalis Sharpe

for the birds frequenting the coastal districts of South Queensland and New South Wales and practically the whole of Victoria. The description given by Sharpe may be taken as typical, though variation is great as commonly seen in Victorian birds. It is quite possible that were long series (and by long I here mean twenty, at least) adult nesting-birds from each locality carefully examined, Victorian birds might be separated as a race.

For Tasmanian birds I propose the name

Ieracidea berigora tasmanica, subsp. nov.

a series I do not exactly correlate with Victorian birds though nearest those, and belonging to the *I. b. orientalis* series. It is absolutely necessary to make comparisons with series to distinguish this, and the real reason for separating it is to emphasize the fact that the *orientalis* form is found in that locality without any intermixture of the *berigora* phase.

The description of the type may be given as follows: General colour above brown with buffy tips to the feathers; on the rump the feathers have spots or bars: the head darker, the feathers with black shaft-streaks. The upper wing-coverts are brown with obsolete bars of buff. Primaries brown with bars of light buff on the inner webs: under aspect of primaries whitish. Tail-feathers narrowly barred with buff. Throat and cheeks white, divided by a black moustachial streak. Under-surface white, the feathers sometimes tipped with brown and the majority with dark shaft-streaks. Under wing-coverts buff. Thighs brown with obsolete bars; under tail-coverts white. Wing 325 mm., tail 185, culmen 21, tarsus 65.

A similar state of affairs occurs at Cape York. From Cairns northward along the coast only birds of the *orientalis* type occur, and the whole of the specimens recorded and procured from the Cape York Peninsula agree in this peculiarity. A good series show these to be also constantly smaller than the typical *I. b. orientalis,* so I propose to name them

Ieracidea berigora kempi, subsp. nov.

I describe the type, a female killed at Utingu, Cape York, September 11th, 1912, as follows: General colour above and below smoky-black or fuliginous-brown, rather lighter on the back and upper wing-coverts; throat and a patch under the eye whitish; black pronounced moustachial streak present. Primaries and secondaries uniform on outer webs, inner webs barred with light buff, but tips uniform. Tail feathers show small rufous barrings on inner web. Wing 369 mm., tail 127, culmen 25, tarsus 70.

From this series the male, female and immature are *all* alike: variation is seen, as the feathers of the under-surface have light bases and often the tips are white also in patches, more or less pronounced: in some cases the head is lighter but the shafts of the feathers remain dark, giving it a striped appearance. None ever approach the lightest phase, though some recall *I. b. berigora*, which is the interior phase of the country south of the Peninsula.

The form which would bear the name

Ieracidea berigora berigora (Vigors and Horsfield)

would inhabit the interior of South Queensland and New South Wales. A couple of records from North-western Victoria suggest that it straggles there.

I have not a series from Eastern South Australia, but all records suggest that this is the only phase there met with, though it is possible the South Australian bird may be a separable race.

The Central Australian birds are very pale and I propose to designate these as

Ieracidea berigora centralia, subsp. nov.

The type is a male collected by Captain S. A. White at the Finke River on February 28th, 1913.

General colour above pale rusty brown, with black shaft-streaks; the rump feathers are brownish rufous, with three or four bars of ashy-white and tipped with white; tail-feathers pale brown, equally barred with narrow rufous bars and tipped with white. Upper wing-coverts like the back, the primaries and secondaries uniformly grey-brown on outer web; inner web white with buff bars, and in the secondaries sometimes the buff markings appear on the outer web. Throat and cheeks white, divided by brown moustachial streak; lower throat white with narrow dark shaft-streaks: sides of body and flanks rufous; thighs white inside, outside brown, rest of under-surface including under wing-coverts white throughout. Wing 315 mm., tail 175, culmen 21, tarsus 65.

The male and female are alike in coloration; birds from the Gawler Ranges and Port Augusta, South Australia agree, as recorded by Captain White, but have a rufous tinge more pronounced on the under-surface.

The range of this Central bird is not yet ascertained, but, as with many other birds, is probably distributed all over Central Australia.

A series from Normanton and Alexandra, Northern Territory, show both phases fairly evenly, and it was suggested that here the different coloration seemed sexual, but this was soon disproved. This is here mentioned, as some observers have been misled and recorded the two phases as the two sexes. It is difficult to understand how to designate such a series save as *Ieracidea berigora,* and this means nothing. The only other alternative is the usage of quadrinomials as

Ieracidea berigora berigora >< *kempi.*

From the Katherine and Mary Rivers, Northern Territory, I have specimens soot-black throughout. The nomination of such specimens save by a binomial is impossible, as similar birds are met with at Cape York and elsewhere. I separated the Melville Island bird under the name

Ieracidea berigora melvillensis

and here give a detailed description of the type.

General colour above dark rusty-brown with darker shafts to the feathers, more pronounced on the head, the feathers of the rump tipped with rufous. Upper wing-coverts like the back, the primaries and secondaries uniform brown on the outer web, barred on the inner web with buff. Tail-feathers barred with buff, more pronounced on the inner web. The throat and cheeks buffish, divided by a black moustachial streak; remainder of under-surface sandy-brown with dark shaft streaks; under wing-coverts reddish with black shaft-streaks: under aspect of wing buff. Thighs brown. Wing 352, tail 205, culmen 23, tarsus 71.

Other Melville Island birds vary towards Cape York birds, but altogether they are separable on account of the more pronounced striping, being comparable with a dull brown washed *I. b. berigora.* Indeed, from Coomooboolaroo, Queensland, I have specimens which come quite close to the Melville Island form.

At the present time I class all West Australian birds as

Ieracidea berigora occidentalis Gould.

The chief character of these birds is their smaller size; in coloration they recall *I. b. berigora* and *I. b. orientalis,* but generally the darkest birds show striping. They agree with Eastern experience in that the coastal form is the darkest, but generally through lack of barriers both phases occur together. The majority I have seen are dark birds, but light specimens have been examined from Perth, Wilson's Islet, Broome Hill and Parry's Creek, and conversely dark birds from Lake Way.

In the preceding I give seven names, and the only alternative to their usage is the binomial. As the latter hides all the peculiarities known of the variation of this interesting bird, it seems certain that the comparative multiplicity of trinomials is a benefit. That there is more to be learnt from the usage of these is the note that the King Island bird was recorded as *H. berigora* by A. G. Campbell, while Mellor and White wrote: "A specimen procured by Dr. J. Burton Cleland was certainly more like *H. occidentalis* than *H. berigora* (=*orientalis*). The bird was very light and striped on the breast."

All birds known from Coastal Victoria and Tasmania are of the *orientalis* type, so that it is remarkable that the birds of the islands between should be of the *berigora* (true) type.

I have treated the birds as referable to one species only ; I have studied them also as referable to two, but the distribution is even more complex than as above: thus the two earliest names are *I. berigora* and *I. orientalis*, as *I. occidentalis* is undoubtedly equivalent to the former.

We would then have

I. orientalis.

Coastal Eastern Australia (Queensland, New South Wales, Victoria). Tasmania, South-west Australia, Mid-west Australia, North-west Australia, Coastal Northern Territory. Apparently *not* South Australia.

I. berigora.

Inland New South Wales, possibly North-west Victoria, all South Australia, Central Australia, West Australia even on the coast, Interior Northern Territory and South Queensland, King Island and Flinders Island, Bass Straits.

I. orientalis × *I. berigora.*

Melville Island.

A majority of the birds from many localities would look like my third group, and I do not recommend this disposition. I am quite certain that neither proposals will satisfy everybody, but at least I have shown that I have attempted to deal with this problem which has puzzled every ornithologist who has studied Australian birds, and I do not claim to have solved the problem. I only hope I have prepared a workable basis for future research.

The species occurs also in New Guinea, and in conclusion I would quote from the pens of the recognised authorities on New Guinea, also written as recently as this year, thus: In the *Nov. Zool.*, Vol. XXII., February 12th, 1915, Rothschild and Hartert admit:

"p. 29. *Ieracidea berigora novæguineæ* A. B. Meyer. The only difference between typical *H. berigora* and these Papuan specimens (*i.e.* one from Dampier, one from Vulcan, and others from the Sattelberg, Owgarra on the Angabunga, and Avera on the Upper Aroa River) appear to be the almost unspotted upper wing-coverts, which have only concealed rufous spots on the basal portions, generally darker shoulders, crown and sides of the head of the Papuan race. These differences, except the darker shoulders of the reddish individuals, are, however, also seen in N.W. Australian specimens (*Ieracidea berigora melvillensis* Mathews, *Austral Avian Rec.*, Vol. I., p. 34, 'Melville Island and Northern Territory'). As it is, further study will be required to prove the distinctness of *I. berigora berigora, occidentalis, novæguineæ*, and *melvillensis*; but Mr Mathews' diagnosis of his '*melvillensis*'—'larger size and black cheeks'—is not a convincing one, and the larger size in any case appears to be not constant." p. 41. "The sexes differ evidently in size, but it is a mistake to suppose that the reddish individuals are females—in fact, the colorations seem to be merely individual, and neither dependent on sex nor on age."

While this was in the press, the *Ibis* Jubilee Supplement No. 2 appeared, dealing with the birds of New Guinea by Ogilvie-Grant. On page 272 he records Van Oort's observations, writing: "A specimen is recorded from Merauke and referred with some doubt to *H. b. novæ-guineæ*, as it appears to differ from the type-specimen from German New Guinea in lacking the bands and spots on the tail, and in having a longer tarsus, as in typical *H. berigora* from Australia."

The reader of my review will readily conclude that the New Guinea form comes into the Australian quandary: that is, if it be recognised the other races should be; if they are lumped it should also be discarded.

Genus—CERCHNEIS.

CERCHNEIS Boie, Isis 1826, col. 970 (976) .. .. Type *C. rupicola.*

Aegypius Kaup, Skizz. Entwick.-Gesch. Nat. Syst., p. 29, 1829 .. .. Type *C. tinnunculus.*
(Not of Savigny 1809.)

Falcula Hodgson, Journ. As. Soc. Bengal, Vol. VI., p. 365, 1837, 1838 .. .. Type *C. tinnunculus.*

Tinnunculus Gray, List Genera Birds, 1840, p. 3 .. Type *C. tinnunculus.*
(Not of Vieillot 1809.)

Poecilornis Kaup, Classif. Saugeth. Vögel, p. 108, 1844 Type *C. sparverius.*

Tichornis Kaup, Classif. Saugeth. Vögel, p. 108, 1844 .. Type *C. naumanni.*

SMALL Falconine birds with small bills, long wings, long tails, long legs and short toes.

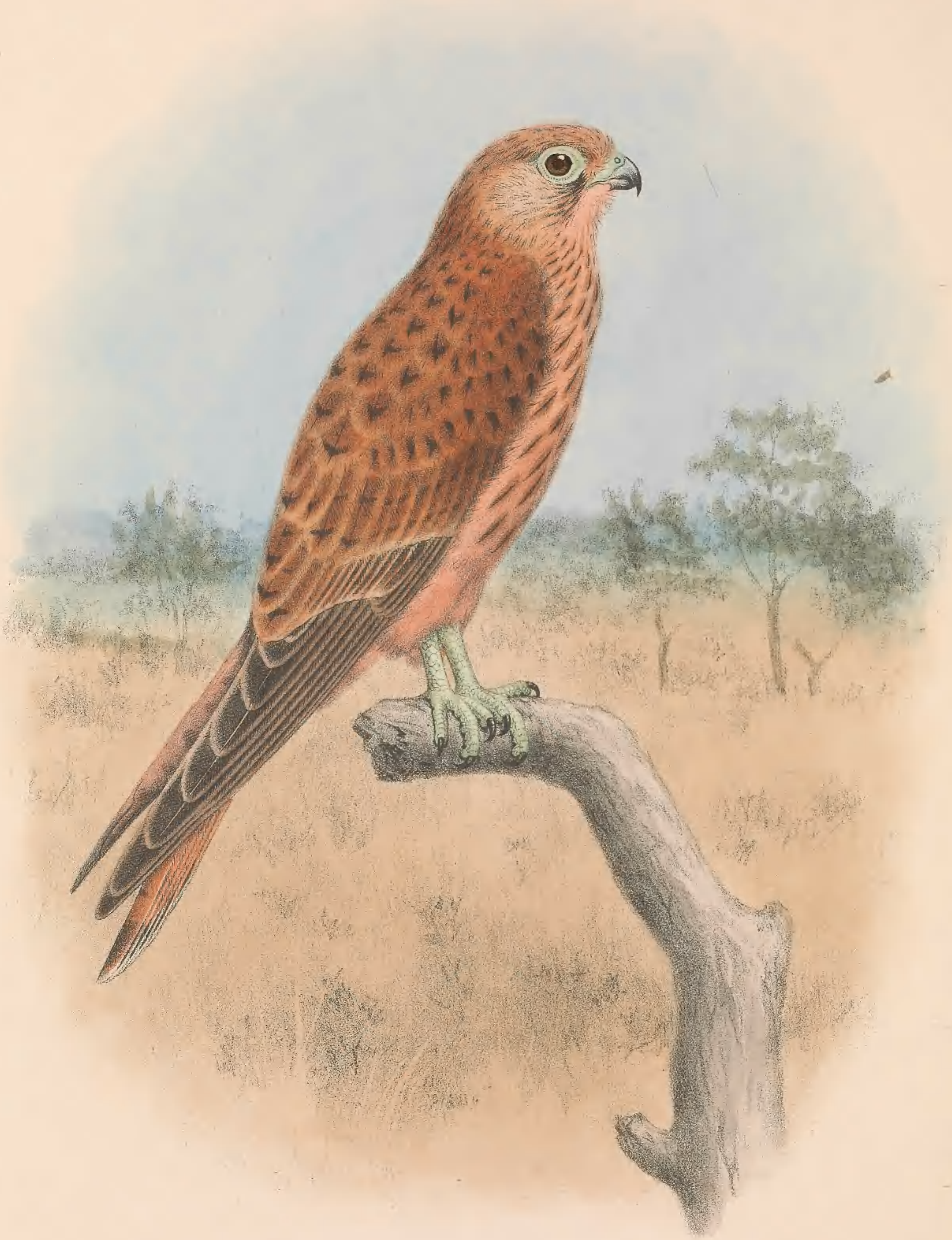
The bill is typically Falconine, very small with small cere almost hidden: the edges of the upper mandible toothed. The wings are long, with a peculiar wing formula, for though the first primary is long, it is shorter than the fourth; the second and third are much longer, the second slightly the longest.

The tail is long and rounded, more than half the length of the wing, as nearly as can be, two-thirds.

The legs are long and thin; the tarsus is covered, as usual, with reticulate scales. The middle toe is not unusually lengthened and is about two-thirds the length of the tarsus.

Why this genus should have been submerged in *Falco* by authorities such as Hartert, who simultaneously recognised *Ieracidea,* I am unable to understand. I see more difference between *Cerchneis* and *Falco* than between *Falco* and *Ieracidea.* Other writers, such as Ogilvie-Grant, have accepted the length of the middle toe as being a good character to separate generically *Accipiter* and *Astur,* concluding these are "natural genera," and then have lumped *Falco* and *Cerchneis* where exactly similar differential features can be observed, *with this difference*: in the two latter genera a different wing formula and colour pattern have been evolved, whereas the former pair have not succeeded to this extent in separating themselves.

It may be useful to quote that Pycraft, probably following Suschkin, recorded in the *Proc. Zool. Soc.* (Lond.) 1902, pp. 310-311: "The phalanges are also characteristic. . . . The numerous variations of this character are useful generic characters, and will be found in the keys which it is proposed to add to this paper." These keys were not added, but on p. 315 *Tinnunculus* (=*Cerchneis*) is recognised as a valid genus. It is puzzling to understand how systematic ornithologists accept such data in some cases and reject them in others, apparently due to prejudice of conclusions previously formed and not from actual detailed study of skins and facts.



H Goodchild del

Witherby & C°

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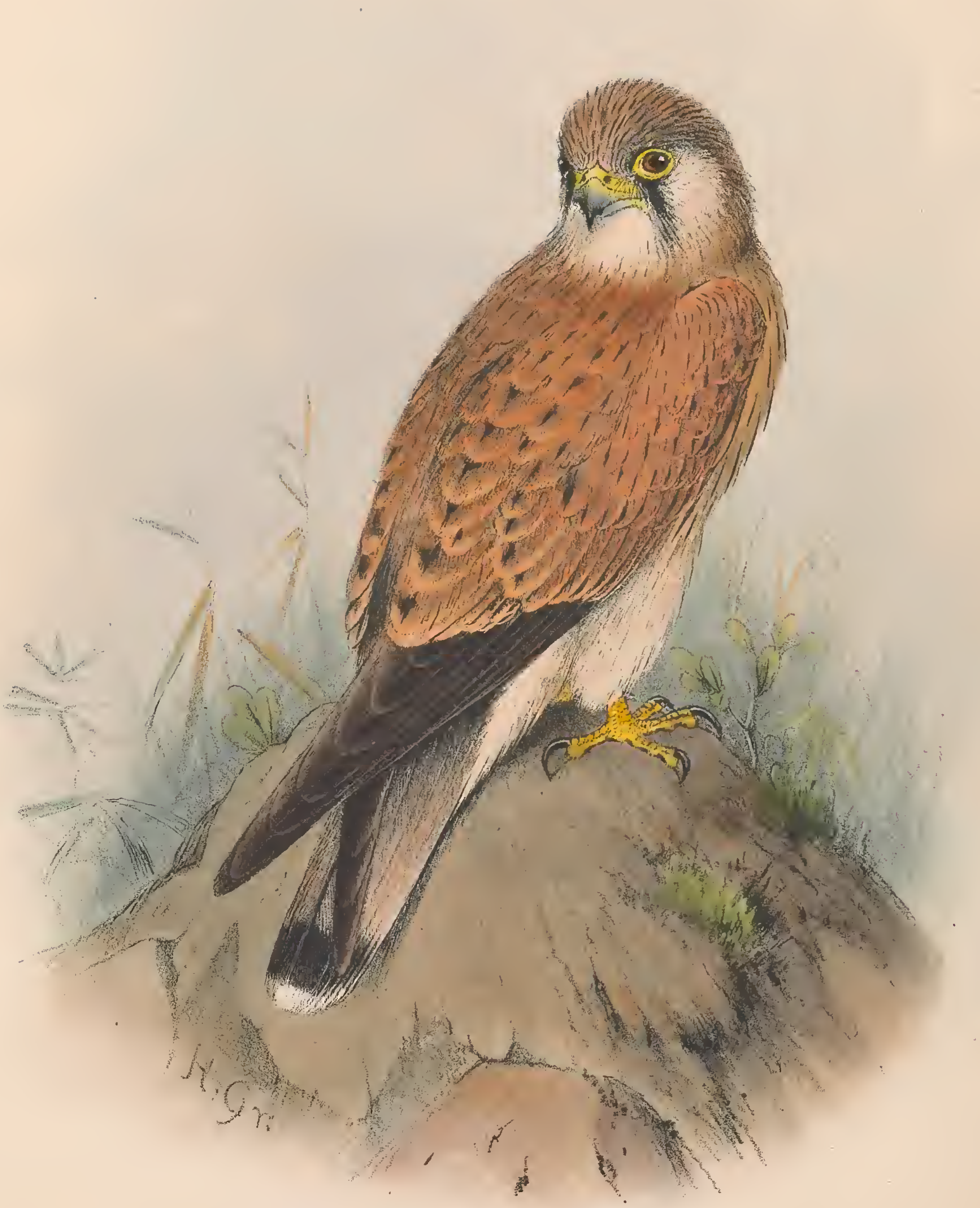
CERCHNEIS UNICOLOR.

(WESTERN KESTREL).



H. Grönvold. del. Witherby & Co.

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CERCHNEIS CENCHROIDES.

(NANKEEN KESTREL).

No. 314.

CERCHNEIS CENCHROIDES.

NANKEEN KESTREL.

(Plates 257 and 258.)*

Falco cenchroides Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 183, 1827: Australia=Parramatta, New South Wales.

Parametta Falcon, Latham, Gen. Hist. Birds, Vol. I., p. 225, 1821.

Falco cenchroides Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 183, 1827.

Tinnunculus cenchroides Gray, Genera Birds, Vol. I., p. 21, 1844; Gould, Birds Austr., Vol. I., pl. 13, 1848; Sturt, Exped. Centr. Austr., Vol. II., App., p. 14, 1849; Zuchold, Journ. f. Orn. 1858, p. 35 (Q.); Gould, Handb. Birds Austr., Vol. I., p. 35, 1865; Diggles, Orn. Austr., pt. viii., 1866 (Q.); Ramsay, Cat. Austr. Accip., p. 60, 1876; *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 177, 1878; Gurney, Ibis 1881, p. 469; *id.*, List Diurn. Birds Prey, p. 98, 1884; Ramsay, Proc. Linn. Soc. N.S.W., Ser. II., Vol. I., 1886, p. 1096, 1887 (N.-W.A.); *id.*, *ib.*, Vol. II., p. 166, 1887 (N.-W.A.); *id.*, Tab. List Austr. Birds, p. 1, 1888; *id.*, Suppl. Cat. Austr. Accip., p. 9, 1890; North, Austr. Mus. Cat., No. 12, p. 22, 1890; *id.*, *ib.*, No. 4, p. 67, 1898.

Cerchneis immaculata Brehm, Isis 1845, p. 357: Australia; New South Wales.

Cerchneis cenchroides Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 431, 1874; Legge, Papers Proc. Roy. Soc. Tasm. 1886, p. 237, 1887 (Tas.); Hall, Key Birds Austr., p. 3, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 38, 1901; A. G. Campbell, Emu, Vol. II., p. 11, 1902 (Vict.); Le Souëf, *ib.*, p. 141, 1903 (N.T.); Hill, *ib.*, p. 161, 1903 (Vict.); A. G. Campbell, *ib.*, p. 205, 1903 (King I.); Carter, *ib.*, Vol. III., p. 34, 1903 (M.-W.A.); Hartert, Nov. Zool., Vol. XII., p. 209, 1905 (N.T.); D'Ombrain, Emu, Vol. IV., p. 125, 1905 (Vict.); Lawson, *ib.*, p. 133, 1905 (W.A.); Berney, *ib.*, Vol. V., p. 19, 1905 (Q.); Batey, *ib.*, Vol. VII., p. 3, 1907 (Vict.); Hall, *ib.*, p. 26, 1907 (N.-W.A.); Austin, *ib.*, p. 28, 1907 (N.S.W.); Mathews, Handl. Birds Austral., p. 42, 1908; Burrell, Emu, Vol. VIII., p. 95, 1908 (N.S.W.); Mathews, *ib.*, Vol. IX., p. 5, 1909 (N.-W.A.); Gibson, *ib.*, p. 72, 1909 (S.-W.A.); Crossman, *ib.*, p. 86, 1909 (W.A.); Hall, *ib.*, p. 126, 1910 (S.A.); Whitlock, *ib.*, p. 191, 1910 (W.A.); Howe, *ib.*, p. 229, 1910 (Vict.); Ogilvie-Grant, Ibis 1910, p. 167 (W.A.); Littler, Handb. Birds Tasm., p. 9, 1910 (Tas.); Hill, Emu, Vol. X., p. 267, 1911 (N.-W.A.); Stone, *ib.*, Vol. XII., p. 113, 1912 (Vict.);

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* The Plates are lettered *Cerchneis cenchroides* and *C. unicolor*.

North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 285, 1912 ; Mathews, List Birds Austr., p. 113, 1913 ; Macgillivray, Emu, Vol. XIII., p. 152, 1914 (Q.) ; S. A. White, Trans. Roy. Soc. South Austr., Vol. XXXVIII., p. 426, 1914 (Central).

Cerchneis unicolor Milligan, Emu, Vol. IV., p. 2, 1904 (aberration) : Yalgoo, West Australia ; Hall, Key Birds Austr., 2nd ed., p. 110, 1906 ; Mathews, Handlist Birds Austral., p. 42, 1908 ; Whitlock, Emu, Vol. VIII., p. 178, 1909 (W.A.).

Cerchneis cenchroides cenchroides Mathews, Nov. Zool., Vol. XVIII., p. 253, 1912 ; *id.*, List Birds Austr., p. 113, 1913 ; White, Trans. Roy. Soc. South Austr., Vol. XXXIX., p. 745, 1915 (Central).

Cerchneis cenchroides unicolor Mathews, Nov. Zool., Vol. XVIII., p. 253, 1912 ; *id.*, Austral Av. Rec., Vol. II., p. 56, 1912 ; *id.*, List Birds Austr., p. 113, 1913.

Cerchneis cenchroides milligani Mathews, Nov. Zool., Vol. XVIII., p. 253, 1912 : Parry's Creek, North-west Australia ; *id.*, List Birds Austr., p. 113, 1913 ; *id.*, Ibis 1914, p. 109 (Melville Island).

DISTRIBUTION. Australia ; Tasmania.

Adult male. Mantle, back, scapulars, upper wing-coverts and innermost secondaries pale cinnamon rufous with dark sagittate centres to the feathers and incomplete bars on the innermost secondaries ; bastard-wing and primary-coverts blackish-brown with paler edges to the feathers on their outer webs, inner webs of the primary- and secondary-quills for the most part with tooth-like pattern with an infusion of rufous, outer secondaries margined with white at the tips becoming cinnamon-rufous on the inner ones, marked brown on the outer webs, the inner webs being marked with brown and white ; second and third primaries incised on the outer webs and the first and second on the inner webs ; rump and upper tail-coverts ash-grey with dark shaft-streaks ; tail pale ash-grey with a slight tinge of rufous, chiefly on the outer webs, an indication of dark bars on the inner webs, a broad subapical black band and tipped with white, the outer pair of feathers paler and inclining to white ; crown of head pale grey with dark shaft-lines and heavily tinged with rufous ; hinder cheeks and ear-coverts dull white ; a dark brown line from below the eye to the sides of the throat ; base of fore-head, throat, abdomen, thighs, under tail-coverts and under wing-coverts white ; axillaries white with black shaft-lines which are more or less spear-shaped. Bill bluish, base and orbital space yellow, cere yellow ; eyes dark brown ; feet and legs deep yellow. Total length 330 mm. ; culmen 14, wing 237, tail 147. Figured. Collected at Derby, North-west Australia, on the 20th of June, 1886.

Adult female. Similar to the adult male but differs chiefly by the absence of grey on the head, rump and upper tail-coverts, and almost entire absence of grey on the tail, which is for the most part rufous with dark bars, the black shaft-lines on the under wing-coverts, and its larger size. Wing 257 mm. Collected on Melville Island, Northern Territory, on the 17th of June, 1912, by Mr. J. P. Rogers.

Immature birds are more heavily spotted.

Nest. In a hollow limb of a tree or crevice of a rock. Sometimes a deserted nest of a *Corvus*.

Eggs. Clutch, four (or five). Ground-colour buff, covered with markings of reddish-brown, which are either heavy or light. Axis 35.8 mm. ; diameter 30.1. West Australian eggs have more gloss—38 by 29.

Breeding-season. August to November.

NANKEEN KESTREL.

Mr. Caley of Parramatta, New South Wales, must come first in the list of Australian field ornithologists as the first memorable essay on Australian Ornithology by Vigors and Horsfield in the *Transactions of the Linnean Society of London*, Vol. XV., 1827, was based on his collections donated to that Society. Further, it must not be forgotten that the collections were only half worked out.

The present species is one of his discoveries and the note accompanying the description (p. 184) reads:

"This bird, as we are informed by Mr. Caley, is called *Nankeen Hawk* by the settlers. It is a migratory species. My specimens were shot in May and June 1803. At that time the species was plentiful, but ever afterwards I observed it but sparingly. On the 3rd of August, 1804, I made the following note: 'I saw no *Nankeen Hawks* this autumn. I never observed it attacking the fowls.'

"The species is closely allied to a group which is noted for the general similarity and the corresponding disposition of its colours, and which includes our *Kestril*, *F. tinnunculus* Linn, the κεγχζις of Aristotle; the newly-characterised European species *F. tinnunculoides* Temm.; the African species *F. rupicolus* Daud.; and some others. The group may be observed to possess a greater shortness of wing than is usual among the true *Falcons*, a character which points out the passage from those birds to the *Hawks*. Our species appears decidedly distinct from any of the group which we have met with."

I wonder whether these were the same specimens described by Latham in the *General History of Birds*, Vol. I., p. 225, 1821, under the name Parametta Falcon, as follows:

"Size of a Merlin, and somewhat like that bird. Bill small, black, irides yellow; plumage above fine brown, the feathers margined with rufous; chin, throat and breast, blotched brown and white; belly and thighs dusky white, barred with rufous; inner webs barred with a pale colour; tail even at the end, crossed with twelve or fourteen pale clay-coloured bars, rather obscure, except on the inner webs, where they are more conspicuous; wings long, reaching near to the end of the tail; legs slender, long, yellow, claws black; feathers of the thigh long, reaching halfway on the shins.

"Inhabits New South Wales.

"A.—Length 15 in. Bill black; cere yellow; plumage above brownish ash colour; beneath wholly white; quills and tail darker than the rest of the plumage; tail eight inches long, crossed with twelve or fourteen obsolete dusky bars; quills the same, but the bars only on the inner webs; legs stout, scaly, three inches in length, and yellow, the feathers hanging over the joint before; claws long and pale.

"Inhabits New South Wales—found about Parametta; perhaps differing from the other only in sex."

The name connection suggested the above reference to Caley, as he lived at Parramatta, but the descriptions do not agree. It may be that Latham described his "Parametta Falcon" from a painting, but no details are given and it must be remembered that when this work of Latham's was published he was a very old man and consequently inaccuracies in the description may be forgiven him.

Mr. Thos. P. Austin has written me from Cobbora, New South Wales, as follows: "A very common species in all parts I have visited which is lightly timbered. Here, although never in very great numbers, there are always a few pairs about. They are very quiet, and of all our Hawks it shows the least fear of man. They have a peculiar habit of posing almost motionless in the air about 50 feet from the ground; they do this even when there is a very strong wind blowing, then suddenly they will turn with the wind and sail away very rapidly with graceful flight. Many of them breed here and return to the same nesting-place for several seasons. I have never known them to nest anywhere but within a hollow, although I know of many instances of them taking possession of the nest which has been built by some other species. They usually lay four eggs, but it is no uncommon thing to find a clutch of five, and I have a set of six in my collection."

Dr. A. Morgan has sent me the following note: "A common bird in all parts of South Australia. At Laura these birds had a bad reputation as chicken-eaters, so I shot a few birds to find out what they fed on, and the stomach of every bird contained the remains of mice, but on one occasion I saw one devouring a small bird: I have also found the remains of beetles in the castings about their nesting-places; they catch their prey by hovering over and pouncing upon it. They are not at all shy birds and are still to be seen hovering over the park lands about Adelaide, and even resting upon the buildings in the city itself. For some years a pair roosted under the eaves of a house at Glenelg, opposite the stopping place of the train. They came in each night almost exactly at sundown and left before I was up in the morning. They lay their eggs in hollow trees, on ledges in cliffs without making any nest, or sometimes if hollows are scarce, in the old nests of crows or magpies. In the non-breeding season they use the hollows as roosting places. The eggs are two to six in number, usually four: average size of 35 eggs, 3.90 × 3.10 cm.; largest egg, 4.20 × 3.10 cm.; smallest egg, 3.70 × 3.00 cm. Earliest date on which egg taken, September 14th, by Mr. J. M.

Merryfield at Kallioota. Latest date about middle of August by Mr. W. Gilbert, near Morgan."

Captain S. A. White has informed me: "The Kestrel is to be seen on the treeless plains, in the ranges, amongst the timber, on the seashore, swamps, in fact almost in every situation. I have seen the bird in the City of Adelaide. They are most useful to mankind for they destroy a wonderful lot of mice, grasshoppers and other vermin, and place no toll upon the white man's goods for the services rendered. It is a very familiar sight to see the lovely little birds hovering over a field of corn or haystack or even a stable-yard and pouncing down and seizing a mouse with great rapidity; their peculiar chatting call is a common one in our country. They lay in a hollow bough, placing the eggs on the bare wood: the number is generally four and their coloration varies in a most marked degree; some eggs are peppered over with very fine spots of rusty-brown and others with big blotches of dark red."

Mr. Tom Carter's notes read: "The Kestrel was the next commonest hawk to the Brown Hawk in the Mid-west. They laid their eggs, in number from three to five, in hollow spouts of gum trees, or on ledges of cliffs, both inland and on the coast. They also often laid in the broken tops of the large white anthills that were so plentiful about Point Cloates. I have noted eggs on dates between August 10th and November 1st in various years. On November 2nd, 1898, I observed a pair at Broome Hill, where they are rather scarce, that had a nest in a large dead tree. In September, 1911, when I was on the Gascoyne River, numbers of Kestrels were dying in the district, and several squatters told me they had noticed the fact over a large area of country there."

A number of interesting notes are included by North in the *Austr. Mus. Spec. Cat.*, No. 1, Vol. III., and I quote therefrom the following accounts. Thus Dr. Macgillivray wrote:

"*Cerchneis cenchroides* is plentifully distributed throughout the district, finding its living on the open plains, whether covered with saltbush, grass or stunted scrub, poised in the air a minute, then dropping down to investigate whatever has attracted its attention, or to capture something of food value, such as grasshoppers, crickets, and other insects, lizards, and small snakes, mammals such as mice, and the young of ground breeding birds." Mr. K. H. Bennett, from Mossgiel, New South Wales, observed: "Is an extremely common species, being met with everywhere in the district. Its powers of flight are considerable, but like *Hieracidea orientalis* is seldom, if ever, used in the capture of its prey. It is a very active bird, and may frequently be observed poised on outstretched and quickly vibrating wings, while it scrutinises the ground beneath. Should the movement of some insect or small reptile attract its attention, it is unerringly pounced on, and either devoured on the spot or carried off to some perch to be eaten at leisure. It breeds in September, generally taking possession of the disused nest of another species, but more often that of *Corone australis.* Occasionally it deposits its eggs, Parrot-like, in a hole in a branch or trunk of a tree." Mr. G. A. Keartland, from Melbourne, Victoria, added: "The pretty little Nankeen Kestrel is a great favourite of mine, and should be held in good repute by all dwellers in the country. These birds are, as a rule, perfectly harmless as far as chickens are concerned, but are great hunters of mice, crickets, lizards and grasshoppers. While the Kestrel is found throughout Australia, they are most numerous in the agricultural portions, where they may be seen flying round the haystacks, or fluttering over the stubble in search of mice. I have seen as many as seventeen of these birds flying over a field of fifty acres, sometimes skimming close to the ground, and at others, by a slight quiver of the wings, remaining almost stationary for several minutes, they drop like a stone on to their victims, which they carry to the nearest tree or fence to consume. They make excellent pets, and their chaste colouring and graceful movements render them very attractive."

Other notes in the same place refer mostly to nidification and eggs.

Of *Cerchneis cenchroides* Batey observed (*Emu*, Vol. VII., p. 3, 1907) in Victoria: "This bird nested every year on our station; perhaps owing to introduced Sparrows and Starlings taking up the few hollow spouts, it does not breed there now. It still appears, and is found in the Drouin region. Once I saw it peep into a hole in a tree branch where a White-rumped Wood-Swallow had her nest in Riverina. The Kestrel evidently saw there was only one plan to secure the sitting bird, so, thrusting his long leg down the aperture, he pulled the poor thing out."

Burrell has given the following note in the *Emu*, Vol. VIII., p. 95, 1908: "While walking along the Namoi River (New South Wales), unfortunately without my usual companion, the camera, I saw what at first sight appeared to be a gnarled root projecting from the bank. But, being uncertain, and to convince myself, I walked towards it and found it to be a Nankeen Kestrel (*Cerchneis cenchroides*). It was sitting almost erect, with its head turned slightly to one side, resembling broken roots in the vicinity. It allowed me to approach within 10 feet of it before it flew away. In flying I noticed that one of its legs was missing—possibly it had been shot off, and apparently for some considerable time. I am of opinion that the Kestrel, through this deficiency, found it rather difficult to perch on the trees, so took to roosting on ledges of the river banks, where it has acquired the art of root mimicking."

NANKEEN KESTREL.

Three succeeding notes are given by the writers under the name, or refer to, *Cerchneis unicolor.* I will give the history of this after those notes, but would remark how easily literature can be produced unless birds are always procured to verify the facts given.

Under the name *Cerchneis unicolor*, Whitlock has recorded the following (*Emu*, Vol. VIII., p. 178, 1909) from West Australia: "Native name Binbirri. Much more common on the lower De Grey than on the Coongan. It seems to favour the plains rather than the rocky timbered gorges of the latter river. I obtained nests, however, in both districts. In all cases the eggs were laid in hollow limbs of eucalypts, at no great height from the ground. The first I took was in a dead limb, and I should have passed it by had not the tell-tale flake of down at the mouth of a remarkably small nest-hole arrested my attention. As it was, I climbed the tree, half expecting to find the nest of *Barnardius occidentalis*, for which I was then searching. On the lower Coongan I obtained the remarkable number of eight eggs from one nest. They were obviously the production of the same female, as the eggs can be arranged in two sets and the patterns paired, the variation of each complete set being in the tint of the markings. Probably the female lost her first mate and paired again immediately. It is a remarkable contrast that the nests of this species should all be built in hollow spouts, while an equal number of its close ally, *C. cenchroides*, in the Irwin district of the south-west, should, with one exception, have been adapted nests of the common Crow, the exception being built on the shelves of a precipice, possibly in the nest of some other Hawk or Raven."

Crossman also observes (*Emu*, Vol. IX., p. 86, 1909) from Cumminin Station, West Australia, under the name *Cerchneis cenchroides*: "Common. It is quite possible that *C. unicolor* (Milligan) occurs also, as there appear to be two varieties, but I have never handled specimens of the birds." Later, from Broome, North-west Australia (*Emu*, Vol. IX., p. 149, 1910), Crossman added: "I have seen a few Kestrels about, but have not yet been able to ascertain whether they belong to this or the Western species (*C. unicolor*)."

Whitlock gives a long note in the *Emu*, Vol. IX., p. 191, 1910, concerning *Cerchneis cenchroides* in the East Murchison, writing: "This species was generally distributed throughout the district, though nowhere common. It was perhaps most frequent near Milly Pool, where the numerous hollow eucalypts afforded convenient nesting-places. . . . The majority of the males of this species have a bar at the end of the tail which is very pale grey, but what I take to be old males have the tail nearly white and with no bar. All females I have seen possess the bar, and usually show fine black streaks on the breast. I observed no pairs breeding in old Crows' or other open nests. I quite expected local birds would prove to be the Western Kestrel (*C. unicolor*)."

In the *Emu*, Vol. IV., p. 1, July 1, 1904, A. W. Milligan gave a note entitled: "Description of a New Kestrel from Western Australia." I here reproduce the account to accompany the plate I had prepared from the type specimen years ago under the impression it was a valid form. Milligan wrote: "I have great pleasure in adding what I consider a new Kestrel to the list of Australian species. The bird was captured alive some weeks ago at Yalgoo, in the north-western portion of this State (where it is said to be a very common form), and sent to the Western Australian Zoological Gardens, Perth. The Director, Mr. Ernest Le Souëf, and the head keeper of the Gardens, Mr. Giles, were, on its arrival at the Gardens, at once struck with its diminutive form and general rufous coloration, as compared with living forms of *Cerchneis cenchroides* (Vig. and Hors.) which they had in the Gardens. The new bird differs from the common form in not possessing any white or pale feathers on the under-parts of the body, those parts being a decided cinnamon-pink and making it very distinctive. In addition, the tail is not grey, but rusty-cinnamon, and the legs pea-green and not orange-yellow. It also is much smaller. The following is a specific description of an adult male: The whole of the upper surface is deep rusty-cinnamon, the crown and neck feathers with longitudinal black striations, the mantle with black arrow-heads, sparsely distributed, the wing-coverts and secondaries with narrow black crescentic markings. Tail-feathers (rusty-cinnamon, not grey) with black transverse bars, subterminal black band and whitish tips. Whole of under-surface, including under-surface of wings, cinnamon pink, paler than the upper-surface, with a few feathers of the breast striated with sepia. Ear-coverts inclining to greyish-brown. Narrow circle of feathers above eye, and a tuft below eye, blackish-brown. Culmen light reddish-blue; cere light blue, with yellowish tinge: eyes and feet pea-green.

"Type in Western Australian Museum, Perth.

"Owing to the partiality of the bird for young chickens, it is known locally as the 'Chicken-Hawk.' As a consequence, poultry-owners wage a ruthless war with members of the species. Cases have been recorded in Europe where Kestrels, when pressed hard for food, have had recourse to young game. I have not, however, observed this habit with the Nankeen Kestrel in Victoria or Western Australia, and have had splendid opportunities of observing their habits in both States. It is said that the common Kestrel of Europe is represented by a dark resident race in countries bordering on its southern range. Allowing for a tendency towards variability in size and colouring amongst members of the genus, I think, nevertheless, that upon a comparison of the new species with that of the Eastern bird (which is identical with our coast bird) the specific differences will appear such as to justify, on sight, the above separation.

"I assign the scientific name of *Cerchneis unicolor* to the new bird, and the vernacular name of Western Kestrel."

The Director of the Western Australian Museum allowed me to examine the bird and have the present plate prepared. Later, receiving specimens from the Yalgoo District they proved to be normal and have left no doubt that Milligan's specimen was merely an aberration, and not typical of the form inhabiting Yalgoo.

In the *Nov. Zool.*, Vol. XVIII., p. 253, 1912, with the series before me, I ranged the species thus:

Cerchneis cenchroides cenchroides (Vigors and Horsfield).
Queensland, New South Wales, Victoria, Tasmania, South Australia.
Cerchneis cenchroides milligani Mathews.
"Differs from *C. c. cenchroides* in its less size and darker coloration above." North-west Australia.
Cerchneis cenchroides unicolor Milligan.
"Although the type is a 'sport,' the name may be used for the South-west Australian subspecies." South-west Australia.

In my *List of the Birds of Australia*, p. 113, 1913, I maintained this division, adding Northern Territory to the range of *C. c. milligani.*

With a good and fairly representative series now available I cannot recognise any subspecies. All the differences seen seem to be only individual, and every attempt to definitely fix any subspecies has failed.

North also concluded: "There is little or no variation in specimens obtained in widely separated localities, except that due to age."

The examination of the series leads to the conclusion that the plumages have not been understood, as I find male and female in every stage yet recorded. I can see four stages.

First. Heavily spotted plumage: spots black, ground-colour cinnamon-brown.

This plumage is apparently only carried for a very short time, as it is comparatively rare in collections.

Second. Common plumage. Birds breed and it constitutes three-fourths of specimens secured. The spots give place to narrow shaft-streaks and smaller and fewer arrow-shaped markings on back; upper tail-coverts begin to come blue-grey: striping on under-surface deteriorates. The bars on the tail decrease in size from the base.

This is usually recorded as adult female plumage, but many breeding males show it.

Third. The upper-surface becomes more uniform and the tail loses the barring, but the head remains unchanged. This is recorded as adult male, but females also appear in this plumage.

Fourth. Very old birds. Tail coloration previously cinnamon is replaced by grey, save for subterminal band of black with white tip: all the black markings on upper-surface disappear and the head becomes blue-grey with black shaft-lines. Black streaks irregularly lost from under-surface, sometimes being retained after the head has changed to bluish; in other cases all gone, though head not fully changed.

North records this plumage as "adult males, probably very old birds," but I have also females in this stage.

These stages of coloration are met with all over Australia.

GENUS—PANDION.

PANDION Savigny, Descr. Egypt. Hist. Nat., Vol. I., pp. 69-95, 1809	Type	*P. haliaëtus.*
Triorches Forster, Synopt. Cat. Brit. Birds, p. 1, 1817	Type	*P. haliaëtus.*
Balbusardus Fleming, Hist. Brit. Anim., p. 51, 1828	Type	*P. haliaëtus.*

A FALCONIFORM bird with the outer toe reversible, and the tarsus coarsely reticulated throughout.

The first sentence separates this monotypic genus from every other Falconiform genus save *Polioaëtus,* from which the latter effectively divorces it.

The bill is comparatively long, very hooked, sharp, rapidly-descending tip; the lower edge of the upper mandible has a long wavy sinuated appearance, recalling the Aquiline group. The cere is rather large, the nostrils small ovals, semi-operculate, placed midway between culmen ridge and lower edge of upper mandible.

The head bears a slight occipital crest.

The wing is long with the third primary longest, slightly exceeding the second, which just surpasses the fourth: the first is long but is scarcely longer than the fifth, and noticeably less than the fourth and second.

The tail is long, but is just about half the length of the wing, and thus appears comparatively short.

The legs are short and stout; feathering of the thighs advances in front on to the tarsus, which is entirely covered with rough reticulate scales. The toes are shorter than the tarsus, powerful, and the middle toe exceeds the inner and outer by very little: *the outer toe is reversible* and all the claws are practically the same length, being long and rounded.

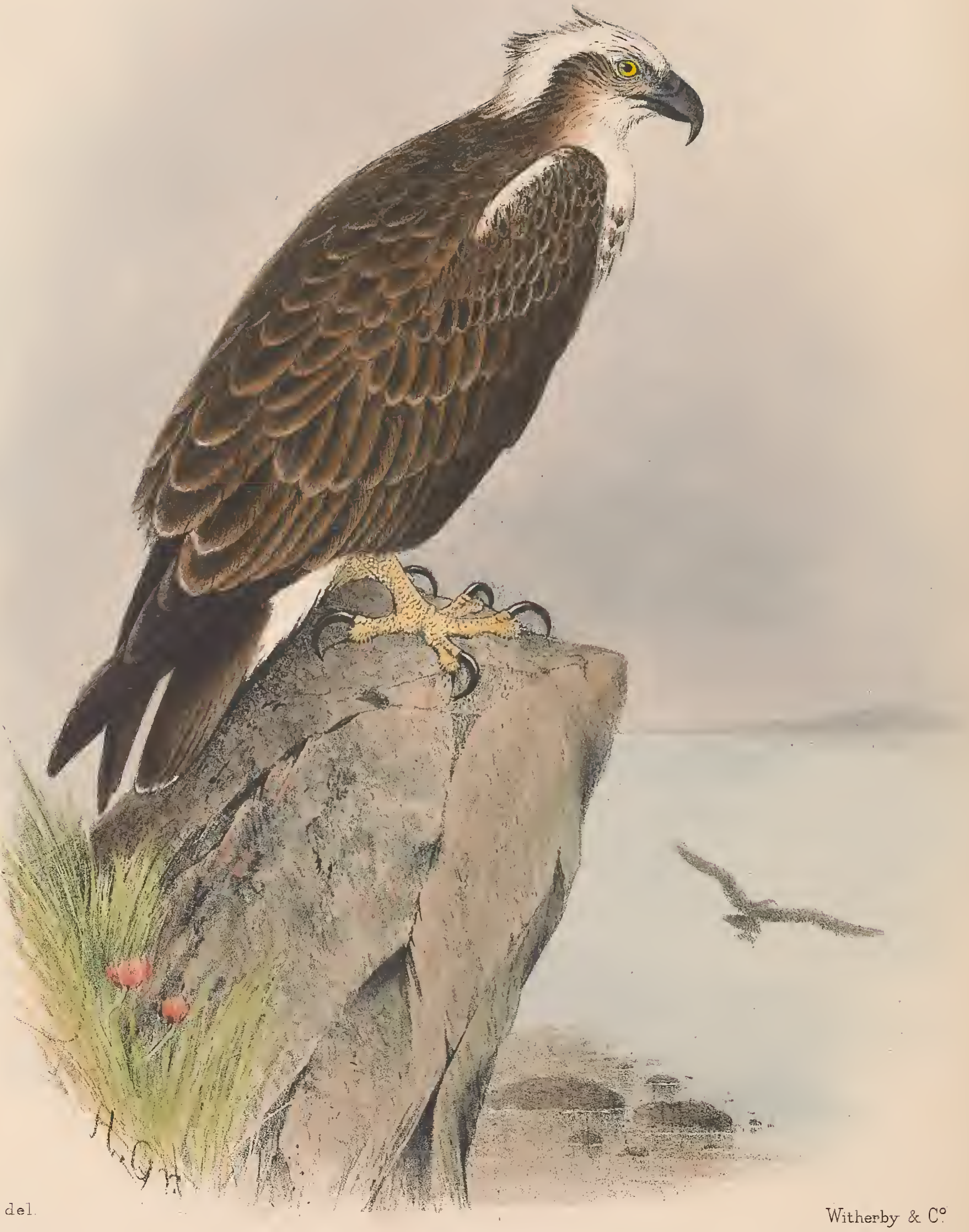
I have left this genus as a monotypic family, placed at the end of the Falconiform birds, though this is a dubious position.

The reversible outer toe is mainly responsible for this location and this seems a poor character. "No aftershaft present" has been continually added as a distinctive feature, but recently this has been shown to be due to inaccurate investigation.

Beddard (*Structure and Classification of Birds,* p. 478, 1898) wrote: "*Pandion* is undoubtedly an aberrant genus, which is by several (*e.g.* Gadow) made the type of a separate family, and is thought by some to lead towards the owls. It differs from other falcons in having no aftershaft, in its somewhat peculiar tensores, patagii, and deep plantar tendons . . . whatever may be thought about *Pandion.* . . ."

I do not get much help from such conclusions as the above, and referring to Pycraft (*Proc. Zool. Soc.* (Lond.), 1902, p. 315) am no further advanced by his admission. "With regard to *Pandion,* though I felt certain it had nothing to do with the *Striges,* I had not yet discovered any further clue as to its real affinities." He then added Suschkin's views, which he accepted, thus: "In the Perninæ, *Pernis, Baza, Elanoides, Leptodon* and *Pandion.* But from views he expressed in conversation he would, I suspect, probably make a separate sub-family for *Pandion*—Pandioninæ, and most, I think, will feel this advisable."

The relationship of *Pandion* to *Pernis* does not seem to have been demonstrated, and it so obviously differs superficially that I do not accept this grouping. Beddard makes no comment on its position as recorded above, while Pycraft states that he had discovered no clue to its affinities, so that it appears reasonable, in view of its known peculiarities, to allow it to remain where Sharpe placed it. The monotypic genus is widely distributed with scarcely any superficial differentiation, so that it must be an ancient form. It is probable therefore that study of nestlings would give valuable assistance in solving the problem of its relationship, as it is obvious that we do not at present know much about them.



H. Grönvold. del.

Witherby & C°

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PANDION CRISTATUS.

(WHITE-HEADED OSPREY).

No. 315.

PANDION HALIÆTUS.

WHITE-HEADED OSPREY (FISH-HAWK).

(Plate 259).*

Falco haliætus Linné, Syst. Nat., 10th ed., p. 91, 1758: Sweden, Europe.

Buteo cristatus Vieillot, Nouv. Dict. d'Hist. Nat., Vol. IV., p. 481, 1816; "Nouvelle-Hollande" = Tasmania.

Buteo cristatus Vieillot, Nouv. Dict. d'Hist. Nat., Vol. IV., p. 481, 1816.

Pandion leucocephalus (not Wood) Gould, Synops. Birds Austr., pt. iii., pl. 41, Apl. 1838: Tasmania; *id.*, Proc. Zool. Soc. (Lond.) 1837, p. 138, Dec. 1838; *id.*, Birds Austr., Vol. I., pl. 6, 1848; *id.*, Handb. Birds Austr., Vol. I., p. 22, 1865; Sharpe, Cat. Birds Brit. Mus., Vol. I., p. 451, 1874; Ramsay, Proc. Zool. Soc. (Lond.), 1875, p. 578 (Q.); *id.*, Cat. Austr. Accip., p. 62, 1876; *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 178, 1878; Masters, *ib.*, p. 269, 1878 (N.T.); Gurney, Ibis 1882, p. 595; *id.*, List Diurn. Birds Prey, p. 113, 1884; Broadbent, Proc. Roy. Soc. Queensland, Vol. I., p. 93, 1884 (Q.); Legge, Papers and Proc. Roy. Soc. Tasm. 1886, p. 237, 1887 (Tas.); Ramsay, Tab. List Austr. Birds, p. 1, 1888; North, Austr. Mus. Spec. Cat., no. 12, p. 23, 1890; *id.*, no. 4, p. 69, 1898; Hall, Key Birds Austr., p. 5, 1899; Milligan, Emu, Vol. II., p. 70, 1902 (S.-W.A.); Carter, *ib.*, Vol. III., p. 34, 1903 (M.-W.A.); Cornwall, *ib.*, Vol. VII., p. 172, 1908 (Q.); Mathews, Handl. Birds Austral., p. 43, 1908; Gibson, Emu, Vol. VIII., p. 64, 1908 (W.A.); Whitlock, *ib.*, p. 179, 1909 (W.A.); Broadbent, *ib.*, Vol. X., p. 233, 1910 (Q.); Littler, Handb. Birds Tasm., p. 10, 1910 (Tas.); Ogilvie-Grant, Ibis 1910, p. 167 (W.A.); Hill, Emu, Vol. X., p. 267, 1911 (N.-W.A.); Barnard, *ib.*, Vol. XI., p. 22, 1911 (N.Q.); North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 291, 1912; Witmer Stone, Austral Av. Rec., Vol. I., p. 146, 1913 (Tasm.); Agnew, Emu, Vol. XIII., p. 94, 1913 (Q.); Macgillivray, *ib.*, p. 152, 1914 (Q.).

Pandion gouldii Kaup, Isis 1847, col. 270 (new name for *P. leucocephalus* Gould).

Pandion haliætus subsp. *leucocephalus* Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 40, 1901; Le Souëf, Emu, Vol. II., p. 142, 1903 (N.T.).

Pandion haliaetus leucocephalus Hartert, Nov. Zool., Vol. XII., p. 209, 1905.

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* The Plate is lettered *Pandion cristatus*.

Pandion haliaetus cristatus Mathews, Nov. Zool., Vol. XVIII., p. 254, 1912; *id.*, List Birds Austr., p. 113, 1913; *id.*, Ibis 1914, p. 110 (Melville I.); *id.*, South Austr. Ornithol., Vol. II., p. 30, 1915 (N.Q.).

Pandion haliaëtus melvillensis Mathews, Austral Av. Rec., Vol. I., p. 34, 1912 (Melville I., N.T.).

Pandion haliaëtus Mathews, List Birds Austr., p. 113, 1913.

Pandion haliaëtus microhaliaëtus Brasil, " Rev. Franc. d'Ornith., VIII., No. 81, p. 201, 7th Jan. 1916 (New Caledonia)."

DISTRIBUTION. Australia; Tasmania.

Adult female. General colour above glossy sooty-brown with pale edges to the feathers of the upper wing-coverts, scapulars, back and upper tail-coverts, as also the tips of the tail-feathers; outer rectrices coarsely notched with white on the inner webs; flight-quills darker and inclining to black, paler and mottled with white on the inner webs towards the base and white bars on the inner webs of the secondaries; crown of head and nape creamy-white with dark streaks, some of which broaden out and occupy the greater portion of the feather, more especially on the nape; ear-coverts and sides of breast brown, the feathers on the middle of the breast brown, broadly margined or centred with white, while others have only dark shaft-lines; throat and remainder of the under-surface white, including the axillaries; inner under wing-coverts creamy-white, the outer series brown edged with white, the greater series, for the most part, white, marked with pale brown. Iris rich yellow; feet creamy-white; bill and claws black. Total length 500 mm.; culmen 34, wing 437, tail 197, tarsus 59. Figured. Collected at Cape York, North Queensland, on the 21st of April, 1913.

Adult male. Similar to the adult female, but smaller. Wing 400 mm., culmen 31. Collected at Mackay, Queensland, on the 2nd of July, 1882.

Immature. Have the head darker and the feathers forming the band on the breast white, with dark shaft-streaks.

Nestling covered with short brown down, a white patch on the vent and on the body under the thighs, and a streak from the nape to the tail whitish. Sides of head and nape buff; a patch from the eye backwards black; feathers on the throat showing white; feet yellowish-white (West Australia, November).

Nest. Large and bulky, from three to four feet high and the same wide, lined with seaweed. Usually placed on a rock overlooking the sea, but sometimes in trees or on the ground.

Eggs. Clutch, two (four). Ground-colour buff, heavily blotched at the lower end with large reddish-purple markings, the remainder of the surface spotted sparingly with lavender and reddish-brown. Axis 64 mm.; diameter 46. (Point Cloates, 26th of July, 1899.)

Breeding-season. May to September.

THERE does not appear to be any early history of this bird, but it now seems probable that the nests mentioned by Flinders and quoted by Gould under the White-bellied Sea-Eagle are better attributed to this bird.

Flinders wrote (*Voyage Terra Australis*, Vol. I., 1814) p. 64: "Near Point Possession were found two nests of extraordinary magnitude. They were built upon the ground, from which they rose above two feet, and were of vast circumference and great interior capacity, the branches of trees and other matter, of which each nest was composed, being enough to fill a small cart. Captain Cook (see 'Hawkesworth,' Vol. III., p. 195) found one of these enormous nests upon Eagle Island, on the East Coast; and if the magnitude of the constructor be proportionate to the size of the nest, Terra Australis must be inhabited by a species of bird little inferior to the condor of the Andes.

"P. 81: Upon a rock on the side of the hill I found a large nest, very similar to those seen in King George's Sound. There were in it several masses resembling those which contain the hair and bones of mice and are disgorged by the owls in England after their flesh is digested. These masses were larger and consisted of the hair of seals and of land animals, of the scaly feathers of pinguins, and the bones of birds and small quadrupeds. Possibly the constructor of the nest might be an enormous owl: and if so, the cause of the bird being never seen, while the nests were not scarce, would be from its not going out until dark; but from the very open and exposed situations in which the nests were found I should rather judge it to be of the eagle kind, and that its powers are such as to render it heedless of any attempts from the natives upon its young."

These notes were made in January, 1802, in South-west Australia, and on September 14th, 1818, Louis de Freycinet in the History of the "Uranie et Physicienne," Vol. I., p. 456, speaks of a "espèce de tourelle ronde, haute de six pieds." He figures it in the "Atlas," pl. 13. He also describes the eggs and remarks on the remains of the birds' food being at the base of the nest.

Campbell gives a photo of one of the huge structures which is unquestionably an Osprey's nest, and another photo appears in the *Emu*, Vol. I., p. 144, pl. ix., of the same nest. I have not noticed whether the localities recorded by Cook and Flinders have been revisited or whether the nests are in existence. A few other notes mainly concern themselves with the size of the nests and the coloration of the beautiful eggs, but few observations regarding the birds themselves have been recorded.

Gould's notes read: "The White-headed Osprey, though not an abundant species, is generally diffused over every portion of Australia suited to its habits; I myself shot it in Recherche Bay, at the extreme south of Tasmania; and Gilbert found it breeding both at Swan River on the western, and at Port Essington on the northern shore of Australia. . . . It takes up its abode on the borders of rivers, lakes, inlets of the sea, and the small islands lying off the coast. Its food consists entirely of living fish, which it procures precisely after the manner of the other members of the genus, by plunging down upon its victims from a considerable height in the air with so true an aim as rarely to miss its object, although an immersion to a great depth is sometimes necessary to effect its accomplishment. Its prey when secured is borne off to its usual resting-place and devoured at leisure. Wilson's elegant description of the habits and manners of the American bird is in fact equally descriptive of those of the present species. Independently of its white head, this species differs from its near allies in the much lighter colouring of the tarsi, which are yellowish white slightly tinged with grey. . . . When near the water its flight is heavy and flapping, but when soaring aloft at a great altitude its actions are the most easy and graceful imaginable; at one moment it appears motionless, and at another performs a series of beautiful curves and circles, apparently for mere enjoyment."

North's notes in the *Austr. Mus. Spec. Cat.*, No. 1, Vol. III., chiefly refer to nests and eggs, and I quote the following: Mr. H. L. White wrote: "Mr. Henry Nielson, of Mackay, Queensland, while employed by me collecting during 1909, observed upwards of thirty nests of *Pandion leucocephalus* upon the islands inside the Barrier Reef, in the vicinity of Bowen, Mackay and St. Lawrence, sailing nine hundred and twenty miles in a small three-ton cutter during May, June and July. Nesting-sites were about equally divided between trees and rocks; when the first-named is chosen, the tree is invariably a broken topped one: many of the nests on rocks were placed a few feet only above high-water mark, while others were on inaccessible cliffs. One remarkable nest, found on the cliffs of a small island, was over five feet in height, and had apparently been used for many years. With a single exception the nests were substantially built: in one case a few sticks only were used on a rock just above high-water mark. . . . In all, Mr. Nielson observed twenty-eight nests, each containing two or three eggs, and about fifteen with fresh eggs. While a nest is being robbed, the female bird frequently flies round uttering a sort of whistling cry. Upon one occasion only was a bird seen to plunge out of sight in water and reappear with a fish in its claws."

As no accounts are extant of its life-history, there is here an opportunity for the Australian field ornithologist, but this will not be as easy to do as to indicate, as the Osprey has a decided partiality to small islands and rocks difficult of access. I do not meet with any records of colonies such as have been reported from America for the same species, though it is a solitary bird in Europe.

Mr. Tom Carter has furnished me with the following interesting account of his observations: "The Osprey [Aboriginal name—WEEL-BRA] is a very common species all along the North-west Coast and especially or wherever mangroves grow in quantity. When residing at Point Cloates there were always from twelve to fourteen pairs of birds that bred annually along a stretch of coast about seventy miles in length. This gives each pair a range of about five miles. As a rule the nests were ridiculously easy of approach, being built on a sand hummock or a large boulder, or log of driftwood laid on the beach. One nest was built on the flat surface of a saltmarsh, so that one could drive up to it in a buggy and look inside it. As a high and very rugged rocky range, with vast cliffs and gorges, runs parallel to the coast from Point Cloates to the North-west Cape, sometimes being only a quarter of a mile from the beach, the birds could easily have selected sites that would be very difficult, if not impossible, of access had they chosen to do so. It could not be said that they reared their young in peace and quietness, as the numerous natives constantly took both eggs and young to eat. After the jetty was erected at Maud's Landing, 35 miles south of Point Cloates, a crane was put up on the head of it for working cargo. Almost every year a pair of Ospreys built a bulky nest on top of the large wheel on crane about twelve feet above the deck of jetty, and although this nest was constantly pulled down so that the crane could be worked when a vessel came in, the birds persistently rebuilt it. I have recently received some interesting photographs of the nest on the crane from Mr. G. H. Barton, who has the charge of the jetty since I left there in 1902. One photograph shows one of the birds on the nest. Mr. Barton has sent me notes at various times respecting the birds, and in his last states, July 7, 1912: 'A pair of Ospreys have been trying again to build a nest on the crane at end of jetty, but I have been forced to knock it down twice, and now they have built it a third time, and as no boats have called recently it contains three eggs.' As a boat came in soon after Mr. Barton wrote this, he had to pull the nest down and he wrote me on November 11, 1912, that he actually pulled *seven* nests down last year from the top of the crane, and as boats then came in regularly for wool, the Ospreys abandoned the site for that year. For many years a pair of Ospreys laid in an immense nest built in the top of a large red mangrove tree near the North-west Cape. This nest was visible for miles away as one approached it along the flat between the range and beach. On one occasion I climbed up to it but found it impossible to do more than reach the bottom of the nest, and it was so wide I could not reach out far enough to grasp the edges and try to climb up the sides of it. The tree eventually blew down in a hurricane, as the nest would catch a lot of the wind. Another tall nest was found built on a mangrove log laid on the beach. By standing on tiptoe on the log, I could just peer over the edge of the nest, which was 5 feet 6 inches in height. The nests are made of large sticks, masses of seaweed, and any rubbish picked up from the beach. Straw envelopes from bottles thrown from passing steamers were often built into the fabric of nest. Three is the usual clutch of eggs, but on three occasions I have found four in a nest. The old birds fly around in an anxious way when one is examining a nest, uttering a plaintive whistle, but never offer to attack. Another curious site for an Osprey's nest was on the platform of a windmill at Point Cloates that was erected at a well close to the beach. A very curious incident occurred to me at this well years ago, before the windmill was put up. I was riding up to the well in the dark, through low scrub, and a man in my employment was following on a horse a little behind me. Just as I was passing a stunted tree, about 12 feet in height, I heard a rustling noise and my horse started, and then putting down his head, began to 'pig jump' in a determined way, which somewhat disconcerted me, as he was a very quiet old stock-horse that I had never known to buck, and I was riding easy. At the same time I was conscious of there being 'some' thing close behind me, and occasionally touching my back. My first thought was that some wild blacks, whom I knew were about there, were attacking me, but my attention was given to 'sticking on' my horse. After about half a minute of wild plunging on his part, a large object fell to the white sandy ground from behind me, and with more rustling and flopping it vanished in the gloom, and my horse at once stood quiet but trembling. The man behind me had cantered up, hearing the plunging and noises, and excitedly called out: 'Where are they? Why did not you shout to me? Which way did they go?' as he also thought I was attacked by natives. I answered: 'There was something came at me from that bush, but what it was I don't know, but it was not blacks.' I then struck a match or two and examined the ground and the small tree, and upon a horizontal branch of it saw quantities of bird ordure, so I concluded that either an Osprey or White-bellied Sea-Eagle had been in the habit of roosting there (as it was a quite unfrequented place in those days), but on this particular night it had been disturbed by my passing on the horse, and had blundered off its perch on to my horse's rump, perhaps mistaking it for a rock. Its sharp talons caused my horse to buck, when of course the bird would stick its talons tighter on to the horse, and hurt it more. We went on to the well and camped and next morning I saw that my horse's rump was rather badly scratched and scored, and when we went back to where the little incident had occurred the previous night, distinctly saw the marks on the loose sandy ground where a large bird had fallen and the marks where its outspread wings had struck the ground. The small tree was evidently a regular roosting place. It is a most interesting sight to see these fine birds fishing, at times almost disappearing beneath the surface of the sea. I have seen one rise from the water with a fish in *each* foot. There was no mistake in this, as I was well hidden in thick mangroves, and the Osprey dropped in the water within a few yards of me. Ospreys are still common as far south as Shark's Bay, and I saw some daily in 1911 when hunting through mangroves south of the Gascoyne River. They are sparingly distributed along the South-west coast, the old nesting site at Cape Mantelle (which I have visited) having been 'immortalized' by Messrs. A. J. Campbell and A. Milligan. I have never seen a bird any distance inland, nor known one to attack lambs or poultry. The earliest date on which I have noted eggs was June 25, and the latest on September 6, but the latter was probably a second clutch. On December 14, 1896, three small young were still in a nest on Fraser Island, near Point Cloates, where the birds laid every year, but owing to my natives often visiting there in boats, while turtle hunting or fishing, the first lot of eggs rarely escaped being taken by them. On the *western* side of the Exmouth Gulf, where mangroves are scarce, several pairs of Ospreys used to build in some white gum trees growing at long intervals. The only really inaccessible nest that I ever saw was built high up in the small twigs of such a tree. About the first week in July was the regular laying date of these birds about the North-west Cape."

Gould described the Australian Osprey as *Pandion leucocephalus*, but he recorded Gurney's opinion that there was only one species of Osprey.

Sharpe, using Gould's name, admitted the Australian form subspecifically, while all the remainder of the Ospreys were lumped.

Gurney (*Ibis* 1882, p. 594) commented: "In the *Ibis* for 1867, p. 464, I expressed the opinion that the genus *Pandion* is in reality composed of but one species, and that the Osprey is in fact referable to the same species throughout the entire area of its almost cosmopolitan range. It must, however, be admitted that some slight geographical variations do exist which have been recognised by ornithologists of eminence as sufficient grounds for subspecific distinction. . . . The Australasian race, to which the title of *leucocephalus* has been assigned, seems to me not to be separable from *P. haliaëtus* by any constant character except its smaller size; and even this is a somewhat variable characteristic."

The American race, rejected by Sharpe, is admitted in the *Amer. Ornith. Union's Check-list*, 3rd ed., 1910, p. 168. The Australian race may be also recognised, mainly on account of its smaller size and generally whiter head, but Gould's name *leucocephalus* cannot be maintained.

I used in the *Nov. Zool.*, Vol. XVIII., p. 254, 1912, Vieillot's name of *cristatus*, as his *Buteo cristatus* was commonly admitted to refer to the species but not utilised. Vieillot's name was given twenty-two years before Gould's, probably to a bird collected by Péron and Lesueur. However, I later observed that Gould's name had been anticipated, so that under no circumstances can it be retained. This I recorded in the *Austral Av. Rec.*, Vol. II., p. 91, 1914.

I separated the Northern bird in the *Austral Av. Rec.*, Vol. I., p. 34, 1912, under the name *Pandion haliaëtus melvillensis*, but I am not recognising it in this place, as the characters are not constant and I find moreover, the Australian birds, as a whole, constitute only an ill-defined subspecies.

I only admit therefore all the Australian birds as a subspecies under the name

Pandion haliœtus cristatus (Vieillot).

ORDER—STRIGIFORMES.

THE members of this Order have proved of great interest to the systematist, as superficially they recall birds of the preceding Order and are here ranged alongside, though it is generally accepted that they are not so closely related as might be concluded from this approximation. For many years they were only regarded as being worthy of family rank in the Falconine aggregation, but at the present time three families are admitted in this Order alone, and I anticipate further segregation. The examination of skins alone is unsatisfactory, as the members show convergence in every detail, and the most careful criticism of external features would not lead to the recognition of family characters in the group. It is therefore necessary to investigate accurately not only the osteology but also the anatomy of the soft parts and nestlings to determine the systematic position of each genus or species. It was by this means that the classification now recognised was brought about, and it may be here emphasized that with regard to Australian Owls we are completely ignorant of all these important features. Consequently there is good reason for suggesting that the present grouping may be revised at a later date in perhaps unexpected ways.

I would just indicate roughly some of the points which have brought about the present classification.

In the earlier stages, when the Owls were simply ranked as "Nocturnal Birds of Prey" as opposed to the Hawks as "Diurnal Birds of Prey" with family rank, two sections were recognised: Owls with "ears" and Owls without "ears." No Australian Owl shows tufts of feathers on the head known as "ears."

The feathering of the legs and feet were next considered, and genera were recognised as this feature varied. No great alteration was anticipated, however, until Nitzsch examined the pterylosis and found that two extremely different types were present in the group. Osteological examination showed differences in the ear-structure in remarkable ways, and more recently the anatomy of the soft parts has provided more surprises. By means of these researches the Northern Owls have become so well known internally, as well as externally, that even genus-lumpers recognise only about one species to a genus. Thus, *ten* species of Owls are recognised on the British List, and and chief exponent of genus-lumping has been compelled to rank them in *nine* different genera. When it is pointed out that the same worker will only admit *two* genera for the *eight* Australian species, which differ as much as or more among themselves than the British ones do, his inconsistent—not to use a stronger word—action is obvious. When the osteology, etc., of the Australian birds becomes known, it is probable that all the species will prove generically distinct, using the same standard as has been used for British Owls.

The ear apertures have been one item in the differentiation of the Owl genera of northern climes; these have not been studied in the Australian forms. In this place I admit many genera, and I would record that Kaup, from his monographic study of the Order, determined more genera than I recognise at present. I am not at all satisfied that Kaup is not right in all his conclusions. It may be observed that Kaup was a genus-splitter who critically examined all his birds and, carefully observing the skins, recognised the differences and created generic names to display these results. He was, however, too clever to be misled by his own conclusions and was always very careful to observe that the "generic" differences would be better considered as "subgeneric" only. Nevertheless, his caution was not considered, but most of his names were relegated to synonymy without due regard to his facts. More recently, and years after his death, the cold and dispassionate comparison of bird skins and facts has compelled the admission, as valid, of the majority of his "useless and ill-advised synonyms."

In the present instance, three out of the six generic names used in this place are credited to Kaup, and he also gave two other names to two species which I do not separate generically at present. I propose the reconsideration of these two latter, and almost certainly the recognition of one, if not both, of Kaup's divisions. To which reference will be made later.

It might be as well to indicate generally the superficial features of Owls, though these are very well known, probably on account of their night-flying habits. Thus the members, hidden by day, and hunting by night, with peculiar call notes, have excited more interest than the normal day-flying birds. This interest was continued when the strange night bird was captured, as it proved to have a round face with eyes of large size looking forward, and peculiar and beautiful soft plumage and more or less feathered legs and feet. Always rare, and with these strange night habits, weird tales were woven around the Northern birds in ancient times. As far as I know, we have no myths to record in connection with Austral forms: the only interesting item I shall note later was the recognition by the ignorant early colonists of the common species as the Cuckoo on account of its call.

STRIGIFORMES.

As above suggested, Australian Owls have not troubled northern systematic workers much, so that there is not much to record in this respect. I will deal with the general features under the generic names involved, but would again remark upon the apparent incongruity of such workers classing in the same genus such obviously different forms as "*Ninox*" *maculata* = *clelandi* and "*Ninox*" *strenua.* Superficially, these differ abundantly in detail, while of many of the northern Owls such cannot be written. The casual and ignorant methods applied by Northern systematic ornithologists when dealing with Australian birds has been the greatest curse of Australian ornithology, and that such methods are not yet extinct will be fully explained later on when dealing with certain members of this group.

Sharpe, in the *Catalogue of the Birds in the British Museum*, Vol. II., classed all Australian Owls in two genera, *Ninox* and *Strix.* As regards names alone, the latter was incorrect, as is now universally admitted. The former was ranged in the family *Bubonidæ*, the latter *Strigidæ.* In this place the former family name becomes *Strigidæ* and the latter *Tytonidæ.*

The genus *Ninox* was introduced for an Indian Owl, with which I consider no Australian Owl congeneric. It was therefore necessary to provide substitutes from the mass of apparently "useless synonyms." This necessitated the examination of the birds themselves in connection with the names available. It was at once seen that the Australian Owls could not be considered all congeneric. Kaup's names were the earliest given strictly to Australian species and were used for the species as follows:

Spiloglaux for *boobook* and subspecies.

Hieracoglaux for *connivens* and *strenua.*

Rhabdoglaux was proposed later by Bonaparte for *rufa* and *humeralis.*

The definition of the generic characters revealed, as it most commonly does, a bad blunder in connection with the species classed under *Hieracoglaux.* The two species *connivens* and *strenua* are obviously not congeneric, and, furthermore, if it were possible to lump *Spiloglaux, Hieracoglaux* and *Rhabdoglaux*, as Sharpe did and Hartert still does, *strenua* (*Athene? strenua* Gould) would have to be differentiated. I therefore provide for this magnificent species the new generic name

BERNEYORNIS.

It gives me very great pleasure to thus perpetuate the name of my friend Mr. Frederic L. Berney, whose notes on his observations in the field are most excellent and have proved of more than ordinary interest in many connections. We have, then, four genera for four species, and have thus approached the standard laid down by British genus-lumpers.

In the family *Tytonidæ*, however, I am compelled to lag behind, as I can only recognise two genera for four species, though a third seems suggested. I again observe in this connection that Northern genus-lumpers with their ratio of nine genera to ten species in the North, range all these four under one genus—a most remarkable conclusion.

It might be useful to reproduce the distinguishing features of these two families as given by Sharpe in the *Catalogue of the Birds in the British Museum*, Vol. II.

The general features of the Order are expressed in this manner:

"Outer toe reversible; eyes directed forward and encircled by a facial disk; nostrils generally hidden by stiff bristles; plumage soft and fluffy; tibia more than double the length of tarsus."

The family *Bubonidæ* (= *Strigidæ* of this place) is thus diagnosed:

"Hinder margin of sternum with two or more distinct fissures or clefts; furcula free, not attached to keel of sternum; inner margin of claw on middle toe *not* serrated; middle toe always longer than the inner one."

The family *Strigidæ* (= *Tytonidæ* of this place) is then differentiated as follows:

"Hinder margin of sternum entire, with an emargination but no distinct cleft; furcula joined to keel of sternum; inner margin of claw on middle toe serrated; inner and middle toes about equal in length."

It will be interesting to have Australian ornithologists' observations on the value of these characters when applied to Southern Owls.

With regard to the genesis of Australian Strigiformes, it is not possible to indicate much, as superficially they do not give many clues to their origin. I have suggested more than one Northern immigration in connection with Australian Falconiformes, and it is possible that later, with good anatomical knowledge, we may be able to trace some similar migrations in the present Order.

We observe the same scarcity of this group in Tasmania, only two species being there established. A peculiar feature in connection may be suggested: the Tasmanian forms in each case seem to have retained what may have been the earlier state of plumage. This is not certain, but it is strongly indicated in the case of *Strix novæhollandiæ*, as I will hereafter more fully discuss.

A form of the Barn Owl, a world-wide species, occurs throughout Australia but not Tasmania. All the rest of the Owls are Indo-Malayian, or more strictly Austral-Papuan, the most specialised being restricted to Australia. Thus *Spiloglaux* occurs in New Zealand and islands as well as in

Australia and Moluccas. *Hieracoglaux* occurs in New Guinea as well as Australia, but goes all over Australia, save Tasmania.

Gould's *Athene* ? *strenua* is quite unlike any other Owl, its huge size and coloration being remarkable, and it is confined to East Australia. Its relations are quite unknown to me. Almost as peculiar is the other great Owl, *Rhabdoglaux*, which occurs in New Guinea and North Australia alone. Its ancestry is just as uncertain.

The above Owls are classed in the family *Strigidæ*, chiefly because so little is known of their anatomy, and the skins of the more peculiar kinds are by no means common.

In the restricted family *Tytonidæ*, however, even more interest is seen, as in addition to the Barn Owl, the Grass Owl has reached Australia, but is a rare and sparsely distributed bird. The common "Barn Owl" of New Holland is, however, a distinct species, which extends all over Australia and Tasmania and into the islands. This suggests a descent from the Barn Owl, and indicates the earliest migration, supposed from the study of the Falconiform birds, the Barn Owl proper belonging to the second, and the Grass Owl to the last. However, this leaves *Megastrix*, a peculiar form, restricted to New Guinea and Eastern Australia as far south as Victoria, and the route of evolution of this form is another problem.

I conclude that close anatomical study is necessary before such problems as the above can be solved.

Genus—SPILOGLAUX.

Spiloglaux Kaup, Isis 1848, p. 768 .. .. Type *S. n. boobook.*

Small Strigine birds with short bills, short wings, long tails, long feathered tarsus and short unfeathered toes.

The bill is very short and hooked, with a long tip; under-edge of mandible slightly wavy, almost straight; the nostrils almost circular, placed high up in fore part of cere, almost on culmen ridge, and directed forward; the nostrils are on side view obscured by long bristles, but are clearly seen from the front. The under-mandible is medium, broad, scoop-like, with truncate tip.

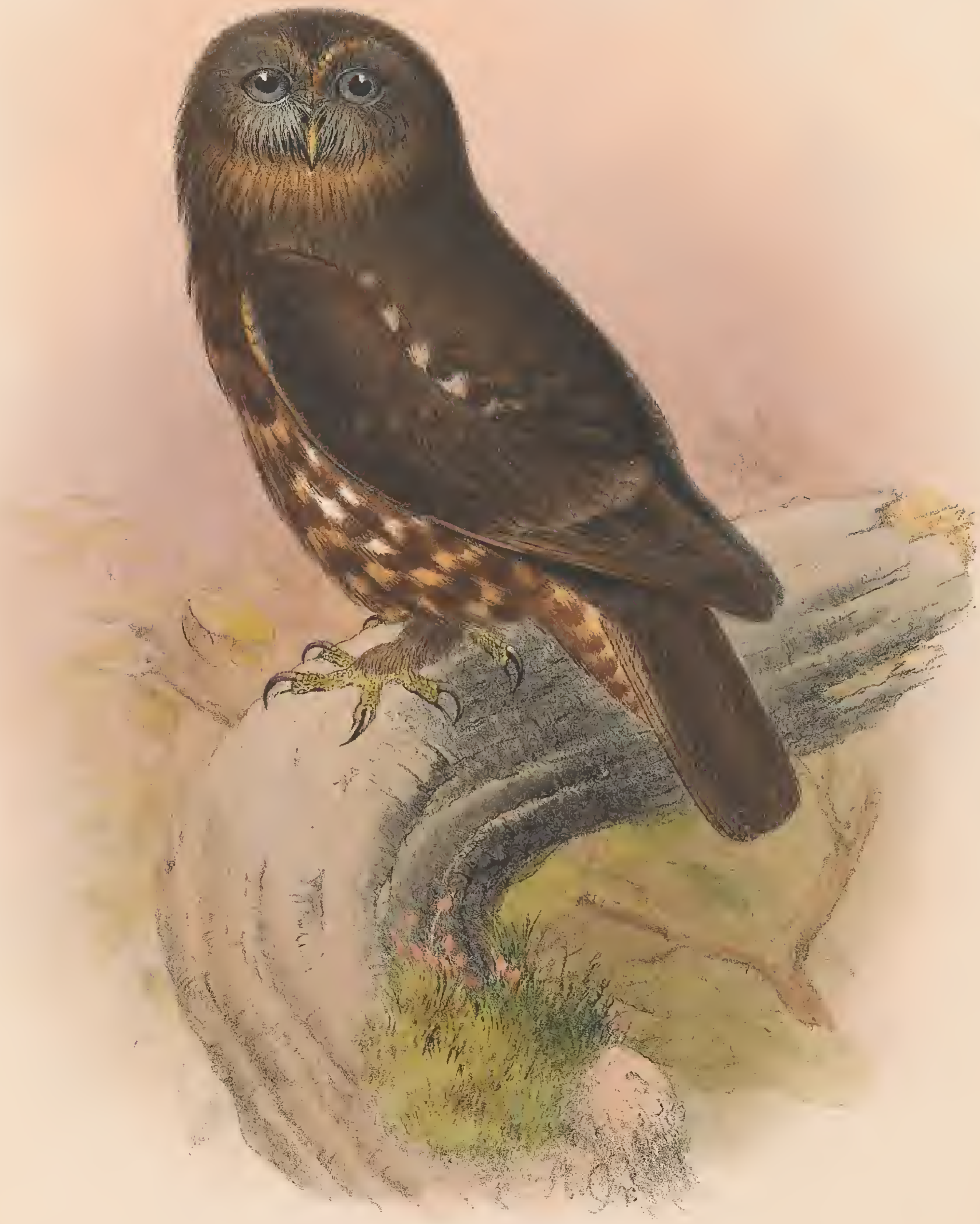
The wing is short and rounded, the fourth primary slightly the longest, but the third, fourth and fifth practically subequal: the second slightly shorter than the sixth and the seventh exceeding the first; the outer web of the first primary is practically soft, not stiff or saw-like.

The tail is long and rounded, almost two-thirds the length of the wing.

The tarsus is short, but long for this group, over twice the length of the culmen and completely covered with feathers.

The feet are very small and weak and covered to the toes with bristles; the middle toe is much shorter than the tarsus; the claws are long and rounded, and the middle claw does not bear serrations.

The preceding, without reference to the proportions, generally applies to the Owls associated under "*Ninox,*" as regards Australia.



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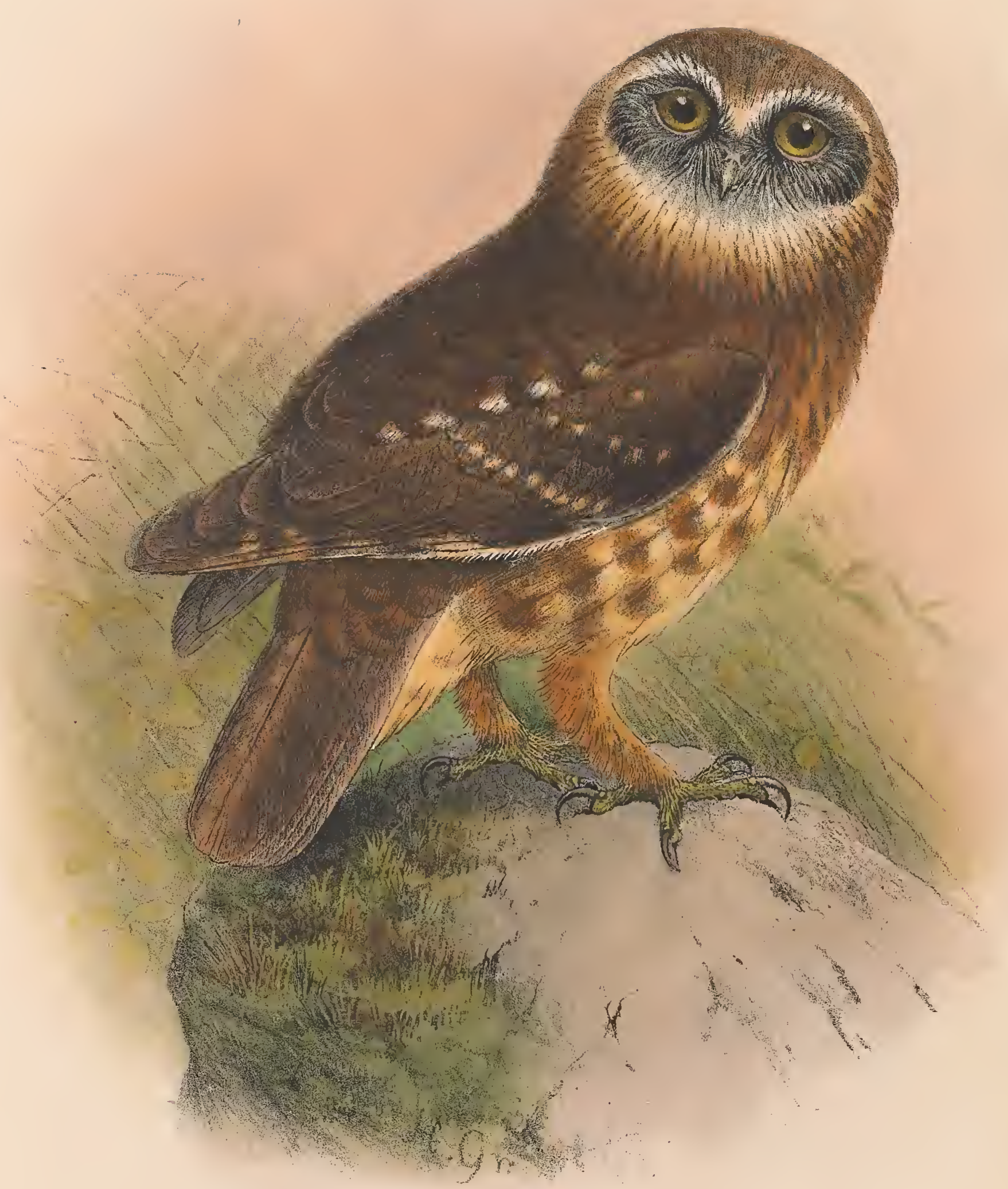
SPILOGLAUX BOWERI.

(BROWN OWL).



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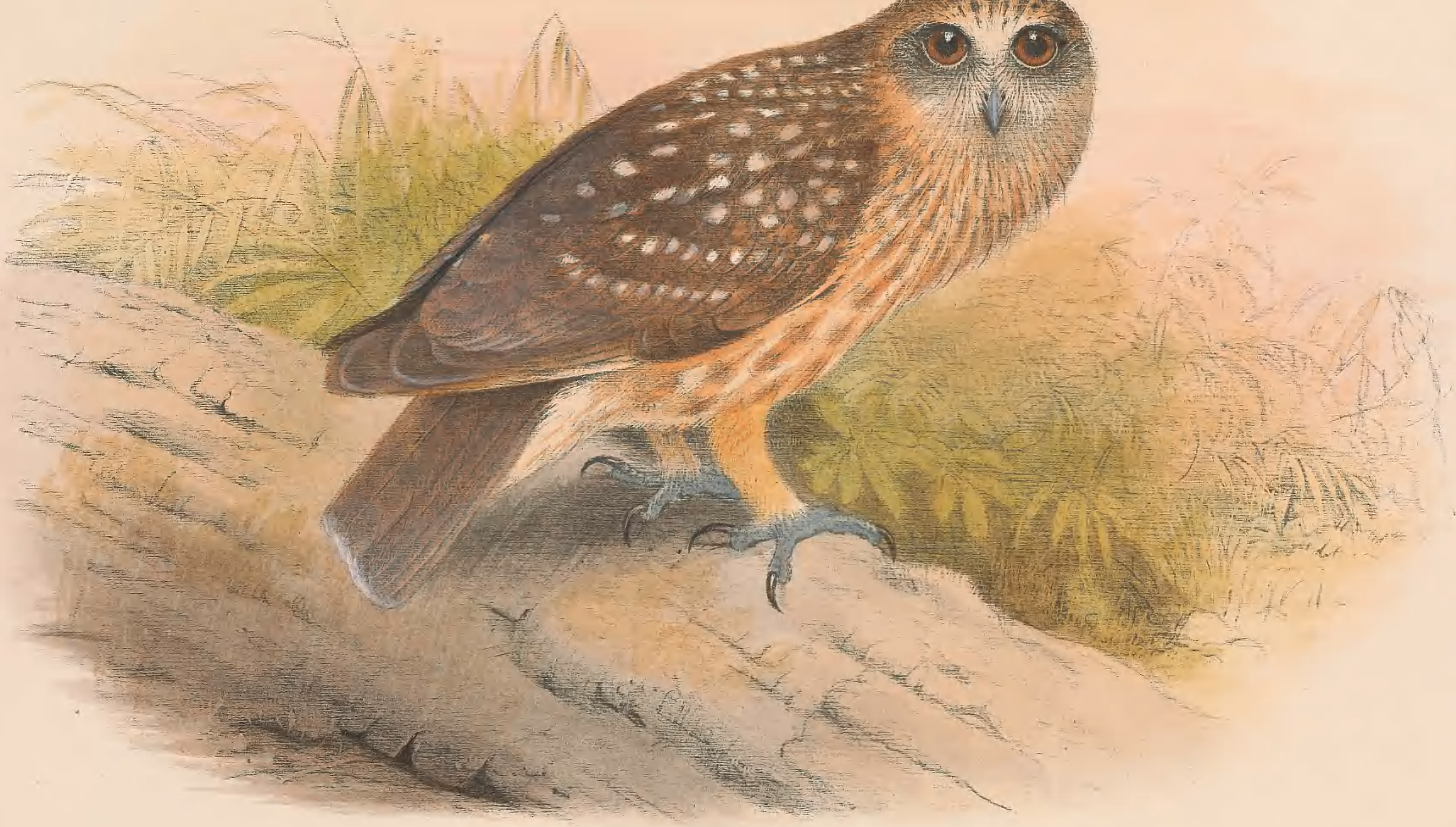
SPILOGLAUX HALMATURINA.

(KANGAROO ISLAND BOOBOOK OWL).



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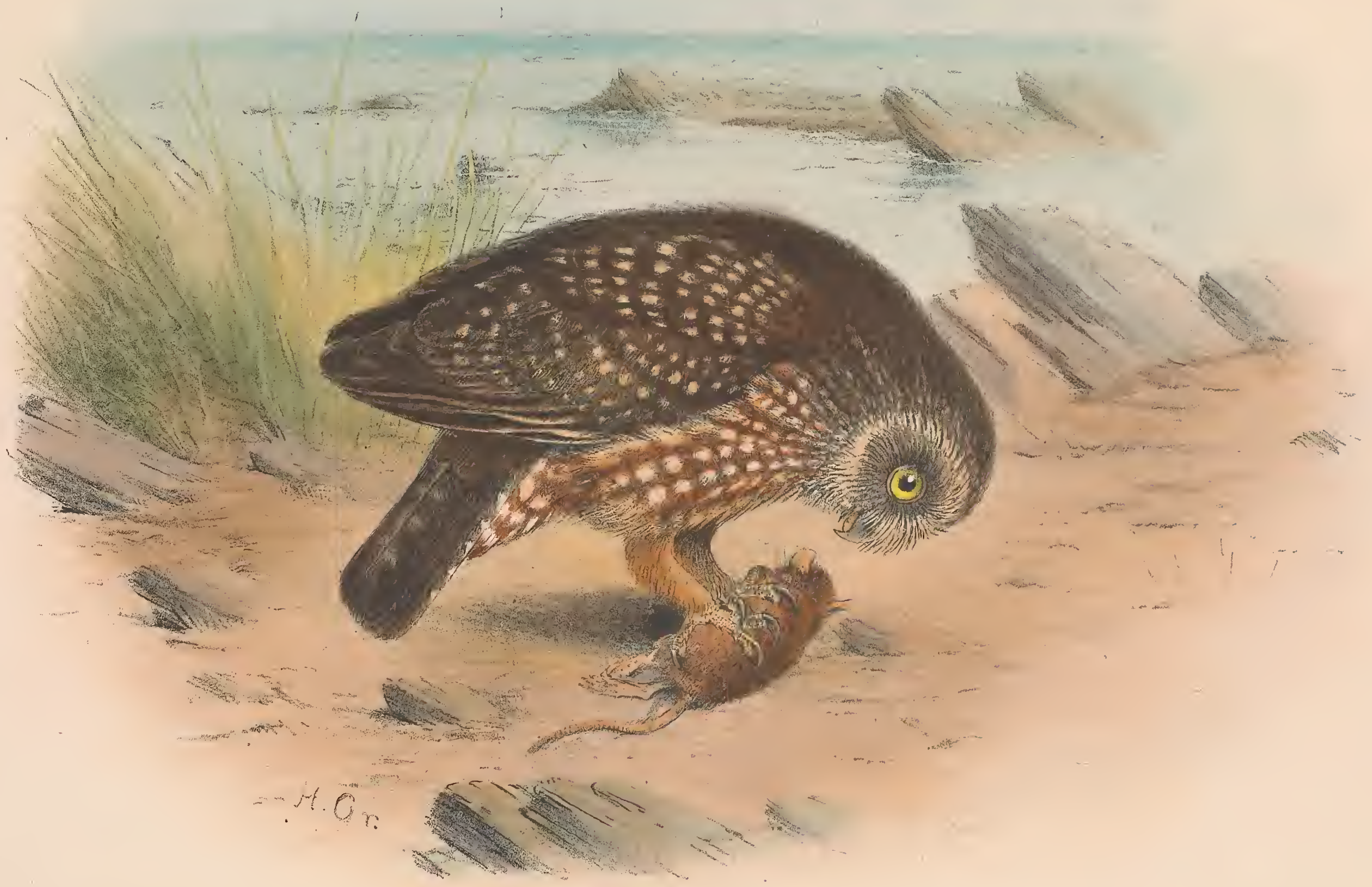
SPILOGLAUX MIXTA

(PALLID BOOBOOK OWL.)



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SPILOGLAUX CLELANDI.

(FLINDERS ISLAND SPOTTED OWL).

No. 316.

SPILOGLAUX NOVÆSEELANDIÆ.

BOOBOOK OWL.

(Plates 260, 261, 262 and 263.)*

Strix novæseelandiæ Gmelin, Syst. Nat., p. 296, 1788: New Zealand = Queen Charlotte's Sound, South Island, ex Forster.

Str(ix) boobook Latham, Index Ornith., Suppl. II., p. xv., 1801: New Holland = New South Wales (from Lambert drawing).

Boobook O(wl) Latham, Suppl. Gen. Synops. Birds, Vol. II., p. 64, 1801.

Str(ix) boobook Latham, Index Ornith., Suppl. II., p. 15, 1801.

Noctua boobook Vigors and Horsfield, Trans. Linn. Soc. (Lond.), Vol. XV., p. 188, 1827.

Noctua maculata (not Kerr 1792) Vigors and Horsfield, *ib.*, p. 189: Tasmania.

Athene boobook Gould, Synops. Birds Austr., pt. iii., pl. 50, 1838; *id.*, Birds Austr., Vol. I., pl. 32, 1848; Sturt, Exped. Centr. Austr., Vol. II., App., p. 17, 1849; Bonaparte, Consp. Gen. Av., Vol. I., p. 42, 1850.

Athene maculata Gould, Synops. Birds Austr., pt. iii., pl. 50, 1838; *id.*, Birds Austr., Vol. I., pl. 33, 1848; Bonaparte, Consp. Gen. Av., Vol. I., p. 42, 1850.

Nyctipetes boobook Selby, Cat. Gen. Subgen. Types Aves, p. 4, 1840.

Nyctipetes maculata Selby, *ib.*

Athene marmorata Gould, Proc. Zool. Soc. (Lond.) 1846, p. 18: South Australia; Bonaparte, Consp. Gen. Av., Vol. I., p. 42, 1850; Witmer Stone, Austral Avian Record, Vol. I., p. 147, 1913.

Athene ocellata Bonaparte, Consp. Gen. Av., Vol. I., p. 42, 1850: in Oceania ? = Perth, South-west Australia.

Jeraglaux boobook Kaup, Archiv. für Naturg. 1851, p. 104.

Jeraglaux marmoratus Kaup, *ib.*

Jeraglaux maculatus Kaup, *ib.*

Spiloglaux boobook Bonaparte, Rev. Mag. de Zool. 1854, p. 544; Gould, Handb. Birds Austr., Vol. I., p. 74, 1865; Mathews, List Birds Austr., p. 114, 1913.

Spiloglaux marmorata Bonaparte, Rev. Mag. de Zool. 1854, p. 544; Gould, Handb. Birds Austr., Vol. I., p. 73, 1865.

Spiloglaux ocellata Bonaparte, Rev. Mag. de Zool. 1854, p. 544.

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* Lettered *Spiloglaux mixta*, *S. halmaturina*, *S. boweri*, and *S. clelandi*.

Spiloglaux maculata Bonaparte, Rev. Mag. de Zool. 1854, p. 544.

Ninox boobook Sharpe, Ibis 1875, p. 258; *id.*, Cat. Birds Brit. Mus., Vol. II., p. 168, 1875; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 178, 1878; Broadbent, Proc. Roy. Soc. Queensl., Vol. II., p. 119, 1886 (Q.); Legge, Papers and Proc. Roy. Soc. Tasm. 1886, p. 237, 1887; Ramsay, Tab. List Austr. Birds, p. 2, 1888; *id.*, Cat. Austr., Striges, p. 12, 1890; North, Austr. Mus. Cat., no. 12, p. 25, 1890; *id.*, Rep. Horn Sci. Exped. Cent. Austr. Zool., Vol. II., p. 57, 1896 (Central); *id.*, Austr. Mus. Cat., no. 4, p. 12, 1898; Keartland, Trans. Roy. Soc. S.A., Vol. XXII., p. 168, 1899 (W.A.); Hall, Key Birds Austr., p. 5, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 43, 1901; Hall, Emu, Vol. II., p. 63, 1902 (N.W.A.); Hill, *ib.*, p. 161, 1903 (Vict.); Milligan, *ib.*, Vol. IV., p. 8, 1904 (W.A.); Le Souëf, *ib.*, p. 36, pl. III., 1904 (Vict.); D'Ombrain, *ib.*, p. 129, 1905 (Vict.); Lawson, *ib.*, p. 133, 1905 (W.A.); Berney, *ib.*, Vol. V., p. 19, 1905 (N.Q.); Howe, *ib.*, p. 30, 1905 (Vict.); A. G. Campbell, *ib.*, p. 141, 1906 (Kangaroo I.); Batey, *ib.*, Vol. VII., p. 4, 1907 (Vict.); Austin, *ib.*, p. 28, 1907 (N.S.W.); Mathews, Handl. Birds Austral., p. 43, 1908; Gibson, Emu, Vol. IX., p. 72, 1909 (W.A.); Hall, *ib.*, p. 127, 1910 (S.A.); Macgillivray, *ib.*, Vol. X., p. 17, 1910 (N.S.W.); Crossman, *ib.*, p. 112, 1910 (N.-W.A.); Ingle, *ib.*, p. 122, 1910 (Vict.); Ogilvie-Grant, Ibis 1910, p. 166 (W.A.); North, Aust. Mus. Spec. Cat., no. 1, Vol. III., p. 296, 1912; Chandler, Emu, Vol. XIII., p. 36, 1913 (Vict.); Agnew, *ib.*, p. 94, 1913 (Q.); White, *ib.*, p. 125, 1914 (Vict.); Cheney, *ib.*, p. 215, 1914 (Vict.); Barnard, *ib.*, Vol. XIV., p. 42, 1914 (N.T.); White, *ib.*, p. 138, 1915 (Vict.); Cheney, *ib.*, p. 204, 1915 (Vict.).

Ninox maculata Sharpe, Ibis 1875, p. 258; *id.*, Cat. Birds Brit. Mus., Vol. II., p. 174, 1875; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 178, 1878; Legge, Papers and Proc. Roy. Soc. Tasm., 1886, p. 237, 1887; *id.*, *ib.*, 1887, p. 85, 1888 (Tas.); Ramsay, Tab. List Austr. Birds, p. 2, 1888; *id.*, Cat. Austr. Striges, p. 16, 1890; North, Austr. Mus Cat., no. 12, App., p. 382, 1890; *id.*, *ib.*, no. 4, p. 18, 1898; Hall, Key Birds Austr., p. 6, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 45, 1901; M'Clymont, Emu, Vol. II., p. 98, 1902 (Tas.); Hill, *ib.*, p. 161, 1903 (Vict.); A. G. Campbell, *ib.*, p. 205, 1903 (King I.); Littler, *ib.*, Vol. III., p. 213, 1904 (Tas.); Mellor, *ib.*, Vol. VI., p. 163, 1907 (Tas.); Legge, *ib.*, Vol. VII., p. 144, 1908 (Tas.); Mathews, Handl. Birds Austral., p. 43, 1908; Dove, Emu, Vol. IX., p. 34, 1909 (Tas.); Fletcher, *ib.*, p. 81, 1909 (Tas.); Littler, Handb. Birds Tasm., p. 10, 1910 (Tas.); North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 301, 1912; Mellor and White, Emu, Vol. XII., p. 161, 1913 (Flinders I.); Cheney, *ib.*, Vol. XIV., p. 204, 1915 (Vict.).

Ninox ocellata Sharpe, Ibis 1875, p. 258; *id.*, Cat. Birds Brit. Mus., Vol. II., p. 170, 1875; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 178, 1878; *id.*, Tab. List Austr. Birds, p. 2, 1888; *id.*, Cat. Austr. Striges, p. 15, 1890; North, Austr. Mus. Cat., no. 4, p. 15, 1898; Hall, Key Birds Austr., p. 5, 1899; Carter, Emu, Vol. III., p. 34, 1903 (N.-W.A.); Hall, *ib.*, p. 41, 1903 (N.-W.A.); Mathews, Handl. Birds Austral., p. 43, 1908; Whitlock, Emu, Vol. VIII., pp. 171-9, 1909 (W.A.); Mathews, *ib.*, Vol. IX., p. 57, 1909 (N.-W.A.); Whitlock, *ib.*, p. 192, 1910 (W.A.); North, Austr.

Mus. Spec. Cat., no. 1, Vol. III., p. 300, 1912; Orton and Sandland, Emu, Vol. XIII., p. 77, 1913 (W.A.); Macgillivray, Emu, Vol. XIII., pp. 133-153, 1914 (N.Q.).

Ninox lurida De Vis, Rep. Sci. Exped. N.E. Queensl., p. 31 (also in another issue, p. 84), 1889: Bellenden Ker, N.Q.; North, Austr. Mus. Cat., no. 4, p. 16, 1898; Hall, Key Birds Austr., p. 6, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 45, 1901; Mathews, Handl. Birds Austral., p. 43, 1908; Broadbent, Emu, Vol. X., p. 233, 1910 (N.Q.); H. L. White, *ib.*, Vol. XV., p. 60, 1915.

Ninox boobook subsp. *ocellata* Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 45, 1901; Le Souëf, Emu, Vol. II., p. 86, 1902 (N.T.).

Ninox boobook ocellata Hartert, Nov. Zool., Vol. XII., p. 210, 1905 (N.-W.A.); Mathews, *ib.*, Vol. XVIII., p. 255, 1912 (S.-W.A.).

Ninox boobook boobook Mathews, *ib.*, p. 254 (N.S.W., S.Q.)

Ninox boobook marmorata Mathews, *ib.*, p. 254 (S.A., Vict.); Mellor, Emu, Vol. XV., p. 53, 1915 (S.A.).

Ninox boobook halmaturina Mathews, *ib.*, Kangaroo Island.

Ninox boobook maculata Mathews, Nov. Zool., Vol. XVIII., p. 254, 1912 (Tas.).

Ninox boobook mixta Mathews, *ib.*, p. 255, 1912 (Parry's Creek, North-west Australia (type), N.T.).

Ninox boobook lurida Mathews, Nov. Zool., Vol. XVIII., p. 255, 1912 (North Queensland).

Ninox boobook melvillensis Mathews, Austral Avian Record, Vol. I., p. 34, Apl. 2, 1912 (Melville Island, N.T.).

Ninox boobook macgillivrayi Mathews, Austral Avian Record, Vol. I., p. 194, March 20, 1913 (Cape York, Queensland).

Spiloglaux boobook boobook Mathews, List Birds Austr., p. 114, 1913; White, Emu, Vol. XIV., p. 186, 1915 (Central).

Spiloglaux boobook marmorata Mathews, List Birds Austr., p. 114, 1913; White, Emu, Vol. XV., p. 158, 1916 (S.A.); *id.*, Trans. Roy. Soc. South Austr., Vol. XXXIX., p. 745, 1915.

Spiloglaux boobook halmaturina Mathews, List Birds Austr., p. 114, 1913.

Spiloglaux boobook maculata Mathews, List Birds Austr., p. 114, 1913; Howe, Emu, Vol. XV., p. 71, 1915 (South-east Vict.).

Spiloglaux boobook ocellata Mathews, List Birds Austr., p. 114, 1913.

Spiloglaux boobook mixta Mathews, *ib.*

Spiloglaux boobook melvillensis Mathews, *ib.*

Spiloglaux boobook macgillivrayi Mathews, *ib.*

Spiloglaux boobook lurida Mathews, p. 115, *ib.*

Spiloglaux boobook clelandi Mathews, Austral Av. Rec., Vol. II., p. 74, Dec. 29, 1913: Flinders I.

Spiloglaux boobook leachi Mathews, *ib.*: Victoria.

Spiloglaux boobook tregellasi Mathews, *ib.*: Frankston, Victoria.

Spiloglaux boweri Mathews, *ib.*: Cairns, North Queensland; *id.*, South Austr. Ornith., Vol. II., p. 30, 1915.

Ninox macgillivrayi Macgillivray, Emu, Vol. XIII., p. 153, 1914 (N.Q.).

Distribution. Australia: Tasmania. [New Zealand, Lord Howe and Norfolk Islands.]

Adult female. General colour of the upper-surface pale earth-brown, the feathers on the head, back, scapulars and upper wing-coverts irregularly marked with spots or blotches of white; bastard-wing and primary-coverts like the back banded with darker brown, as are also the primary- and secondary-quills, both of the latter have large ovate white spots on the inner webs, the second, third, fourth and fifth primaries are incised on the outer webs; the upper tail-coverts have a somewhat rufous tinge and contrasts rather with the back; tail similar to the back, with pale spots or bars on the inner webs of the feathers and pale edgings at the tips; fore-head and feathers in front and above the eye white; eyelids, hinder cheeks and ear-coverts brown with hair-like black tips; cheeks and chin white; throat isabelline, with blackish shaft-tips to the feathers; fore-neck, breast and abdomen rufous-brown, the feathers broadly margined with white, the white increasing in extent on abdomen, lower flanks and under tail-coverts; thighs and tarsi almost uniform pale fawn colour; under wing-coverts similar to the rest of the under-surface but somewhat paler, the greater series and quill-lining dark brown, barred or blotched with white, which fades into grey at the tips of the primaries; lower aspect of the tail-feathers rather paler than the quill-lining. Bill and cere blue-grey; eyes brown; feet blue-grey. Total length 260 mm.; culmen 17, wing 229, tail 132, tarsus 36. Figured. Collected on Parry's Creek, North-west Australia, on the 17th of February, 1909.

Adult female. Upper-surface including the head, back, wings and tail chocolate-brown, with pale spots to the feathers on the hind-neck and white spots on the scapulars and upper wing-coverts; bastard-wing like the back with buff on the outer edges; primary-coverts darker and more uniform; primary- and secondary-quills brown barred with smoke-brown and ovate white spots on the inner webs, the second, third, fourth and fifth primaries marked with buff on the outer webs towards the tips; tail chocolate-brown with smoke-brown spots on the middle feathers and bars on the lateral feathers more particularly on the inner webs, the bars paler and inclining to white towards the base; base of fore-head, fore part of cheeks and throat white with black bristly tips; the feathers surrounding the eye dusky-brown; sides of neck and fore-neck dark tawny-brown, with dark shaft-lines to some of the feathers and ochreous margins to the feathers generally on these parts as well as those on the fore-part of the head and bordering the hinder ear-coverts; remainder of the under-surface bright tawny-brown, the feathers broadly margined with white, some of those on the sides of the body and lower flanks have large twin spots of white; under wing-coverts ochreous buff, more or less marked with central brown streaks to the feathers, the greater series and quill-lining brown with buffy-white markings. Bill and cere dark blue, culmen horn; eyes yellowish-brown, feet greyish. Total length 390 mm.; culmen 18, wing 245, tail 142, tarsus 43. Figured. Collected at Middle River, Kangaroo Island, on the 18th of October, 1905, and is the type of *Ninox boobook halmaturina.*

Adult male. Entire upper-surface uniform dark dusky-brown, with a few fairly large obscured spots of white on the scapulars, larger on the upper wing-coverts and more regular on the inner webs of the primary- and secondary-quills; primary- and secondary-quills somewhat paler brown than the back, with a trace of smoke-brown bars which are paler on the outer webs of the outer primaries; tail uniform brown; the feathers above and in front of the eye dull white at the base with brown tips to those immediately above the eye, and black hair-like tips to those in front of the eye and on the chin; fore-neck, breast, and remainder of the under-surface deep chocolate-brown, the feathers spotted, margined, or barred with white, the white markings small on the breast and large on the abdomen, where there are two or three almost entirely white feathers; lower flanks and under tail-coverts for the most part smoky-buff, the under wing-coverts tinged with the same colour, the greater series and quill-lining brown marked with white. Bill and cere dark blue; culmen and sides of lower mandible horn; eyes grey; feet flesh. Total length 340 mm.; culmen 17, wing 221, tail 127, tarsus 43. Figured. Collected at Peterson's Pocket, near Cairns, North Queensland, on the 19th of December, 1884, and is the type of *Spiloglaux boweri.*

Adult male. General colour above dusky-brown, obscurely spotted with white or buffy-white, the spots small and dull in colour on the head, sides of face, hind-neck and sides of neck, larger and whiter on the scapulars, median and greater upper wing-coverts and inner webs of secondary-quills; tail brown, with smoke-grey bars or spots which are paler on the inner webs towards the base and on the outer webs of the lateral pair of feathers; bastard-wing almost uniform with buff edges to the outer webs; primary-coverts uniform dark brown; base of fore-head, fore part of cheeks and throat buffy-white with black hair-like tips to the feathers; breast and remainder of the under-surface dark chestnut-brown with a buffy tinge, including the under wing-coverts, the feathers broadly margined with white or twin spots of the same colour; greater under wing-coverts and quill-lining pale brown marked with white, the white fading off and becoming obsolete towards the tips of the primaries. Bill dark blue and horn; eyes bright yellow; feet grey. Total length 300 mm.; culmen 15, wing 206, tail 125, tarsus 138. Figured. Collected on Flinders Island, off Tasmania, on the 23rd of November, 1912, and is the type of *Spiloglaux boobook clelandi.*

Immature take on the adult plumage almost at once.

Nest. A hole in a tree.

Eggs. Laid on the decaying bottom, and are white. Three or four form the clutch: they are roundish in shape and measure 41 to 43 mm. by 33 to 37.

Breeding-season. September to December or January.

THE long synonymy above given will indicate that variation is existent (otherwise the many names would scarcely have been tolerated, even if introduced) and that this form of Owl was first described from New Zealand; further, that I do not consider the Australian Boobook Owls other than races of the New Zealand species.

As recent authorities have recognised many distinct species of "Boobook" as occurring in Australia and Tasmania, my views will need explanation. I therefore give full details, but as these are of more consequence to the technical reader, I first give the notes concerning the life-history of the bird. As will be recognised, the life-history of a nocturnal bird is a very uncertain quantity, and it will not be surprising to find that little is known of many members of this Order. In the present case there are quite a number of observations available, but when these are considered we will better understand how little is known. It may be as well to briefly explain the facts in connection with the supposed species "*Ninox*" *boobook, ocellata,* (*maculata*) *clelandi* and *lurida.* The first has been recorded for the great part of Australia; the second for North Australia only; the third for

Tasmania especially, but also Victoria, South Australia, and even New South Wales, while the last-named was the North Queensland bird. The typical locality of "*boobook*" being New South Wales, comparisons must be made with birds from that locality. Birds from the Northern Territory and North-west Australia agree in every essential character, but are noticeably paler, and some specimens closely approximate. From South-west Australia, birds are commonly darker than the preceding, and have been called typical *boobook*, though usually they are slightly paler. However, between South-west Australia and New South Wales comes South Australia, and here darker birds than the latter occur, and in Victoria darker ones still are found, while in Tasmania a small dark bird is found, the typical (*maculata*) *clelandi*. This is at first sight quite distinct from *boobook*, but Victorian birds are directly intermediate, and very often recorded under the Tasmanian name. Some Victorian birds, however, differ appreciably from the Tasmanian ones, and these are just as commonly called "*boobook*." In South Australia the birds approximate to this latter form, while also developing towards the West Australian race. This Victorian bird would be quite sufficient to prove the closeness of the two species, but it has been more commonly used to differentiate them, a view I at one time leaned to. The recurrence of the island (Tasmanian) form in such distant places as Norfolk Island, North Queensland and Melville Island has convinced me of the identity specifically of all the so-called species.

The Neozelanic Owl is very much darker, so that it has not commonly been united to the Australian forms, but some specimens are scarcely distinguishable from some Tasmanian birds. As a matter of fact, there is much more difference between many of the Australian subspecies than between the Tasmanian and Neozelanic forms. The recognition of more than one species would necessitate the acceptance of probably half a dozen, and then the definition of the species would be quite impossible, as these birds are to some extent variable.

The notes hereafter given are to a slight degree ranged in agreement with the localities of the subspecies recognised, but some quotations may be out of place. It is possible that some of the subspecies have different habits, but so little has been recorded that it is quite impossible to give any profitable criticism.

Gould's notes are interesting, as he considered *boobook* and *maculata* (= *clelandi*) very distinct species, and hence wrote:

"I have seen individuals of this Owl (*boobook*) from every one of the Australian colonies, all presenting similar characters, with the exception of those from Port Essington, which differ from the others in being a trifle smaller in size and paler in colour. In Tasmania this species is seldom seen, while it is very common throughout the whole of the southern portion of the continent. It appears to inhabit alike the brushes and those plains which are studded with belts of trees. It is no unusual occurrence to observe it on the wing in the daytime in search of insects and small birds, upon which it mainly subsists. . . . The flight of this bird is tolerably rapid; and as it passed through the shrubby trees that cover the vast area of the belts of the Murray, it strongly reminded me of a woodcock. In such places travellers frequently flush it from off the ground, to which, after a flight of one or two hundred yards, it either descends again or takes shelter in any thickly-foliaged trees that may be at hand."

While of the latter (*maculata*) *clelandi* he stated:

"This species is very generally distributed over Tasmania; it also inhabits South Australia and New South Wales, but in far less numbers. It generally takes up its abode in the thickly-foliaged trees of the woods and gullies, usually selecting those that are most shielded from the heat and light of the sun, spending, like the diurnal species, the entire day in a state of drowsiness, from which, however, it can be easily aroused. Its visual powers are sufficiently strong to enable it to face the light, and even to hunt for its food in the daytime. Like other members of the genus, it preys chiefly upon small birds and insects, which, from the more than ordinary rapidity of its movements, are captured with great facility."

I have no notes regarding the typical (New South Wales) form, so extract the following from the *Aust. Mus. Spec. Cat.*, No. 1, Vol. III.:

"Mr. Geo. Savidge writes: 'The Boobook Owl is fairly common in all parts of the Clarence River District, and may be heard on the flats bordering the river, as well as on the edges of the dense scrubs further inland. The nesting-place is not often found. . . . In the daytime it passes most of its time in some hollow tree or spout, also in the crevices of rocks and in shady trees.' Mr. H. L. White from Belltrees, Scone, N.S.W., adds: '*Ninox boobook* is fairly plentiful in the Upper Hunter District, but more often heard than seen, of course. It is still the popular belief that the *Podargus*, and not this bird, utters the well-known cry of "More Pork." Occasionally the Boobook Owl appears in the garden here, just before dark, and busily employs itself in catching insects, mostly on the wing. For some years a pair of these birds lived close to the house, and became very tame, but unfortunately one day they were startled from their nesting-place in a dense bush, flew into a tree near the Pigeons, and were promptly shot in mistake for hawks.' Mr. K. H. Bennett from Mossgiel, N.S.W., observed in 1886: '*Ninox boobook* is occasionally met with here, but is by no means numerous. During the day it secretes itself in some densely foliaged tree, or overhanging bush. On several occasions, too, I have disturbed it from the deserted burrow of the Rabbit Rat (*Perameles lagotis*). Its prey consists of mice and large nocturnal insects.' "

Of the Tasmanian form more notes are available. M'Clymont (*Emu*, Vol. II., p. 98, 1902) observes: "I have surprised in mid-afternoon the little Spotted Owl ensconced in the foliage of a stringy-bark sapling. . . . Mice are said to constitute its principal food, and to obtain these it does not require to leave its haunts in the bush, for there are bush mice in abundance, which dwell in rocky crannies or beneath tussocks of rank grass, from which they sally forth in quest of food in the daytime, as well as by night—quaint little creatures, cautious rather than timorous in the presence of man." Of the King Island bird, A. G. Campbell (*Emu*, Vol. II., p. 205, 1902) recorded: "This was plentiful in the timbered valley of the Pass River. Its call is pitched a little higher than that of the mainland (Boobook) species."

Mellor's idea of the Tasmanian Owl's note reads (*Emu*, Vol. VI., p. 163, 1907): "The only species identified from its notes was the Spotted Owl (*Ninox maculata*), whose mournful cries were heard on several occasions in the dead of night, as it uttered in subdued tones the words, 'More pork,' being much more feeble in tone than that of the mainland species (*N. boobook*)."

H. Stuart Dove has recorded an interesting item in the *Emu*, Vol. IX., p. 34, 1909: "My friend, Mr. Foster Leek, of Mersey Bluff, was fortunate enough to witness the termination of an encounter between nocturnal fliers, such an incident being, I think, previously unrecorded. One morning last summer Mr. Leek left his cottage about 5.30, and on passing through the garden gate noticed what looked like a heap of feathers outside the fence. On examining the object, he found that two night birds—a Spotted Owl (*Ninox maculata* V. & H.) and a Frogmouth (*Podargus strigoides*)—had been apparently engaged in a fierce duel, and had become entangled and unable to separate. Curiously enough, one foot of the Frogmouth was caught in the Owl's mouth. Both were much exhausted, the plumage was dirty and bedraggled, the eyes blinded with *débris*. The *Podargus*, although the larger, appeared to have suffered more than the Owl, which is compactly built, and I should say would give a good account of himself in battle. On being separated, the Owl flew to a fence, where it rested for a time, afterwards flying off to some more secluded spot: my friend placed the Frogmouth on the low branch of a tree in a sequestered nook, where it remained all day but disappeared before nightfall. The Spotted Owl is the author of the very familiar 'Mopoke' call in our bush during the nights of winter and spring, a sound which the bush-dwellers invariably attribute to the *Podargus*, which is frequently called the Mopoke. I am aware that some observers believe the *Podargus* also calls 'Mopoke,' but the only sound which I can personally attribute to the latter is a curious moaning noise, uttered when sitting upon a stump or fence. The true Boobook Owl (*N. boobook*) we have not in Tasmania, or, at any rate, I have not so far seen a specimen during a long residence in the bush, nor are there any in our museums."

Other notes chiefly concerning the nidification of the Tasmanian bird appear in the *Austr. Mus. Spec. Cat.*, No. 1, Vol. III., where, under the name *Ninox maculata* (=*clelandi*), North records specimens from New South Wales and Victoria. As the latter locality is inhabited by birds which are intermediate between the true *boobook* and the true (*maculata*) *clelandi*, sometimes recorded under one name and sometimes under the other, I here include notes referring to such specimens.

From the *Austr. Mus. Spec. Cat.*, No. 1, Vol. III., I extract Keartland's notes as follows: "I have observed the Boobook Owl (*Ninox boobook*) in nearly every part of Australia I have visited, but it appears to be most numerous in Victoria. Although nocturnal birds, they can see well in broad daylight. Whilst collecting in the Dandenong Ranges, near Bayswater, I disturbed a Boobook Owl in one of the gullies, and, observing that it held something in one of its talons, I shot the bird and found that it was devouring a freshly killed Pilot-bird (*Pycnoptilus floccosus*), the remaining portion of which was quite warm and limp. The Boobook Owl lives principally on birds and mice. At Preston they are troublesome in disturbing the birds in my aviary at night. On going to see whether some stray cat was causing the birds to flutter, I have, on several occasions, found one of these Owls hanging on to the wire netting. In our *Pittosporum* trees, where a number of the acclimatised Sparrows, Starlings and Minahs roost, the Boobook Owl is a regular visitor, usually about 9 p.m., his presence being announced by the squealing of his victim."

Dr. D'Ombrain added: "*Ninox boobook* is very common, and is also frequently shot for being a 'night Hawk.' During 1904, Mr. W. McLennan found five of the nests of this bird; two had clutches of three eggs. One of these nests (containing three young birds) was in the same hollow as that occupied by a family of three young Kookaburras (*Dacelo gigas*) which were only three feet away. These Owls make charming pets, and have always been my favourite bird in captivity; their quaint movements, coupled with their really human faces and grave demeanour, make them most interesting. That they will keep a house clear of rats and mice I am positive, having known them to do so."

Chandler (*Emu*, Vol. XIII., p. 36, 1913), writing on the bird-life of Kow Plains, Victoria, records *Ninox boobook*, but notes: "Seen and heard in five places. The bird in the Mallee calls more rapidly than its representative in Gippsland forests."

As a contribution to the "Mopoke *v.* Podargus" call-note controversy, I quote Miss Muriel Cheney's observations in the *Emu*, Vol. XIII., p. 215, 1914: "For several months past I have heard at night a peculiar metallic call. It appeared to come from the creek, about a mile away, and was never heard earlier than 10 p.m. or 11 p.m. A few days ago I was watching a pair of Tawny Frogmouths (*Podargus strigoides*) flying about our garden, a little after sunset. Occasionally they uttered the call 'Oom, oom,' as if communicating something of importance to one another, especially after a sudden swoop on the part of either. A little later a Boobook Owl (*Ninox boobook*), a frequent visitor, fluttered into one of the pine-trees, and began its leisurely solitary call. Early in the morning I awoke, and hearing this metallic call, determined, if possible, to find the author thereof. It should be noted that the Boobook Owl continued its note during the time of which I am writing. Going out into the garden, I at first found it very difficult to locate the bird (presumably) for which I was looking. At times the cry appeared to come from the east, then from the north, and always from far away. Thinking it best to start the search from home, I stood first under one tree, then another, until, coming to an old, partially leafless eucalypt outside the school fence, I distinctly heard, above my head, the sounds, 'More pork, more pork,' uttered very rapidly from seven to ten times in succession, with a pause of a minute or two before the next series of calls. I could not discern the bird, but it happened to fly down to a low branch, and, being between me and the setting moon, I could see it plainly—in fact, I could have touched it. It was a Frogmouth. For about twenty minutes I stood watching and listening, comparing the two calls as they happened to be uttered together. Then I followed the Frogmouth from tree to tree until it went to a distant paddock, where I could not follow. As a result of my observations, I would say, firstly, that the Frogmouth does call 'More pork,' and, secondly, that no one who has heard the Boobook Owl's and the Frogmouth's calls could ever mistake one for the other. I will indicate what I consider to be the chief points of dissimilarity. The Boobook Owl has a leisurely call, the Frogmouth a quick call; the Boobook utters one call at a time, the Frogmouth from seven to ten calls in succession; the Owl makes a slight pause between the two syllables 'Boo-book,' the Frogmouth makes no appreciable pause between the two syllables; the Owl has the distinct vowel sound 'oo,' whereas *P. strigoides* utters the 'aw' in a guttural manner, not nasal. Heard at close range, it sounds like a hoarse whisper: at a little distance it sounds metallic. Constable Montgomery, of Eldorado, was able to confirm my observations. He has seen and heard the Frogmouth many times."

This circumstantial and apparently reliable observation has been criticised by Mr. J. W. Mellor in the *Emu*, Vol. XV., p. 53, 1915, as follows: "I was very pleased and interested with the notes on birds of the Wangaratta district, Victoria, by Miss G. M. Cheney, which appeared in the *Emu*, and I am glad to know that another enthusiastic observer is in the field. There cannot be too many observers. On one point—namely, the call of the *Podargus*—I must beg to differ from Miss Cheney. I am familiar with the Southern Frogmouth (*Podargus strigoides rossi*), as there are specimens on our property at the Reedbeds, near Adelaide, that are quite tame both by day and night, and I am also familiar with the Boobook Owl (*Ninox boobook marmorata*). Specimens of the latter species perch on clothes-line posts and other points of vantage at night, where they can watch for the mice that come to eat the seed given to the birds in our large aviaries. I have spent much time in studying the habits and listening to the calls of both species. I am still of opinion that the 'Morepork' notes are uttered by the Boobook Owl, and that the Frogmouth does not use this call, but utters notes which sound like 'Boo, boo, boo, boo,' continually repeated, and resemble somewhat the notes of the Bronze-winged Pigeon (*Phaps chalcoptera*), only given in a softer and more dreamy way. I have often stood beneath a tree from which a Frogmouth was calling. I have, also, scores of times been within a few yards of a Boobook Owl and 'seen' it calling. One night, while I was watching, motionless, a bird settled on my head, and on another occasion, while I was waiting to get a shot at some Ducks at the edge of swamps at the Reedbeds, a Boobook settled on my gun-barrel. I mention these facts to show that I am as familiar with the birds in question as I am with barndoor fowls in the yard. I am of the opinion that Miss Cheney heard the call of the Owl and mistook it for that of the Frogmouth." Two pages later, ignorant of Mr. Mellor's dicta, Mr. Martin W. Elliott, of Dumbleyung, near Wagin, West Australia, simply states: "The Boobook Owl may say 'More pork,' but to say that the Frogmouth *does not* is quite incorrect. I have heard it give the cry scores of times."

The solution of such a problem may be that the Frogmouth's cry varies in different parts, and consequently both Miss Cheney and Mr. Mellor, and also Mr. Elliott, are right in their own localities.

Capt. S. A. White has written me from South Australia: "This is a widely distributed bird over South Australia, and is found in the low scrub and upon the plains as well as in the timber-covered ranges. For some time past one of these birds has taken up its daily perch on a low bough of a pine-tree just over the wood heap. When the axe is lifted high while chopping it almost reaches the bird: often a shower of chips surround it, but it does not show the slightest fear; as dusk sets in I have often seen this bird fly from the limb and perch on the roof of the outhouses and watch for rats. Their almost round eggs are laid in a hollow spout, and although the eggs are usually pure white, I have taken them quite spotted with dark brown. The birds do not call much during the breeding-season."

Mr. Edwin Ashby's notes from the *Austr. Mus. Spec. Cat.*, No. 1, Vol. III., read: "The Boobook Owl (*Ninox boobook*) is numerous everywhere I have been in South Australia. I procured specimens near Perth, Western Australia, in which many of the light-coloured blotches were absent, and the barring almost imperceptible on the tail-feathers. A specimen I received from the goldfields, near Siberia Soak, was also very dark plumaged. It was sent to me as the bird that says 'more pork.' I have also shot a bird I believed was making that note at Mount Barker, South Australia, and it proved to be this species of Owl."

Regarding the West Australian bird, Mr. Tom Carter has written me: "This Owl is fairly commonly distributed throughout the state, but is more numerous in the timbered south-west. They are rather erratic in their call notes, as the 'more pork' call (if it belongs to this species) is sometimes heard close round my house near Broome Hill for weeks together, and then many weeks may pass without one being heard. On June 21, 1910, I shot one that was being 'mobbed' by a lot of Red Wattlebirds, and in its gizzard it had two legs and feet, together with some wing bones and feathers of a *Barnardius semitorquatus.* Whether the bird had killed the parrot itself, or picked up the bones, &c., from near a homestead is uncertain, but I rather think the latter is what happened. The Mid-west bird, as far south as the Gascoyne River, is a much paler form, and naturally is most frequently seen in the timber along the river banks and creeks. At Point Cloates (where timber was absent) these birds were usually seen in the winter months about the ravines and gorges of the ranges."

Whitlock, dealing with the Birds on the Pilbarra Goldfield, in the *Emu*, Vol. VIII., p. 179, 1909, recorded *Ninox ocellata*: "The common Owl of the district. I am inclined to think it a migrant, as I flushed five from the foliage of eucalypts during one morning's walk in the upper Coongan district. In all I found five nests. They were all in hollow limbs at various depths, and, with one exception, a lot of chopping was necessary before the eggs were accessible. Three is the usual number of eggs, which are large for the size of the parent bird. An interval of several days seems to elapse between the laying of each egg. The first nest I found was in a very small dead and isolated gum-tree in a secluded gully in the heart of the ranges. The remaining four were all near the main river."

When Hartert recorded birds from the Northern Territory, he called them *Ninox boobook ocellata*, observing: "These birds vary much in colour, but are always distinguishable from *Ninox boobook boobook* by their much lighter and more reddish colour. *Ninox lurida* De Vis is most likely only an extremely reddish example of *ocellata*. Judging from the description, we have several like it. *N. b. ocellata* reaches to Northern Queensland, while Southern and Middle Queensland still have *N. b. boobook*."

Macgillivray, in the *Emu*, Vol. XIII., 1914, p. 153, has written: "*Ninox ocellata*. Marbled Owl.—Mr. M'Lennan heard the note of this species when on his way down the Cloncurry River, and afterwards found it to be quite common on all the creeks and rivers that he visited in the Gulf country. The note is much the same as that of *N. boobook* of more southern latitudes. The specimens obtained averaged from 12 to 12¾ inches in length; *irides yellow*, bill blackish-brown. The stomach contained mostly beetles and grasshoppers. They are spring breeders.

"*Ninox macgillivrayi*. Macgillivray Owl.—A smaller and lighter Owl was obtained at Cape York, mostly at from 22 to 28 miles down the telegraph line and on the Jardine River. The note of this species is much softer than that of either *N. boobook* or *N. ocellata*. Its habits are in all respects similar: iris yellow; bill horn colour, tip black; feet pale bluish-slate. The stomach contained large brown beetles in one specimen, and in another were found the bones and fur of a small rat."

Broadbent's notes about *lurida* are here quoted from the *Emu*, Vol. X., p. 233, 1910: "I first shot this bird at Cardwell in 1885, and it was named by Mr. C. W. De Vis, Curator of the Queensland Museum. It is a rare bird, and hard to find in the scrubs, keeping in all the darkest and thickest places. At dusk it flies out into the open and its call is like the rest of the *Ninox*—'Mopoke' repeated."

The criticism of the forms associated under the name "*Ninox boobook*" and "*Ninox maculata*" (=*clelandi*) has caused the acceptance of a foreign name for that of the species. I have endeavoured to avoid this, but the facts negative such action. Many of the birds on the continent of Australia are more different from each other than the Neozelanic form is from Australian birds. It is regrettable that such an alteration is necessary, but it is impossible to work accurately and neglect the facts which are indisputable. I hope the details hereafter given will substantiate this statement.

The first record of an Austro-Neozelanic Owl is that given by Latham in the *General Synopsis of Birds,* Vol. I., 1781, p. 149, where he described the "New Zeeland O(wl). N(ew) S(pecies). Size of the Little Owl. Bill horn colour, with a black tip; iris yellow; general colour fulvous; but the upper parts of the body are brown, spotted with white, with a mixture of fulvous; the under-parts are fulvous, but the circle round the face is somewhat paler than the rest.

"Inhabits *New Zeeland*—I think *Dr. Forster,* who mentioned the above species to me, said in *Queen Charlotte's Sound,* but am not certain."

This description was Latinised by Gmelin under the name *Strix novæ seelandiæ* (*Syst. Nat.*, p. 296, 1788) as follows:

"St. iridibus flavis, corpore supra fusco albo-maculato, subtus fulvo.

"New Zeeland Owl. *Lath. syn.* 1.1, p. 149, *n.* 39.

"Habitat in nova Seelandia, passerinæ magnitudine; rostro corneo apice nigro. Forster."

Later Latham (*Gen. Synops. Suppl.* I., p. 48, 1787) gave a better description from a specimen in the collection of Sir Joseph Banks, almost certainly the one figured and described by Forster. Upon this latter description Latham (*Index Ornith.* 1790, p. 65) based his name *Strix fulva,* citing Gmelin's name as the synonym of the variety which he made of the first described bird.

This would not have concerned us much had it not been that Kerr brought out a splendid English translation of Gmelin's work in 1792 which, however, did not get beyond the Crows. This work has hitherto been overlooked by ornithologists, though constantly referred to by students of Mammals, and it appears that Kerr was the father of the present usage of trinomials for varieties, not of geographical races alone.

In the present case he proposed (p. 538) *S(trix) novæseelandiæ* for *S. fulva* Latham as being the best description and *S(trix) novæseelandiæ maculata* for the variety first described by Latham and the form named *S. novæseelandiæ* by Latham.

I will have more to write about Kerr's book in connection with the next Order, but make this note here, as Kerr's name invalidates the usage of *maculata* Vigors and Horsfield for a form of the present species.

Forster's name of *Strix fulva,* which had been used by Latham probably at Forster's suggestion, was not published until 1844 (*Descr. Anim.*, Ed. Licht., p. 71), when the locality was given as Queen Charlotte Sound. In the British Museum (Natural History) there is preserved the painting of this bird made by G. Forster, as recorded in the *Hist. Coll. Brit. Mus.* (Nat. Hist.), Vol. II., p. 180, 1906.

BOOBOOK OWL.

In the Second Supplement to the *Synopsis*, Latham (p. 64, 1801) described the "Boobook O(wl). Size of the *Brown Owl*, and at first sight somewhat resembles it, especially on the upper parts, but marked with yellow streaks on the head, and with spots of the same on the back; the chin and throat are yellow, streaked and spotted with rufous; belly ferruginous, with pale irregular spots and markings; thighs and legs covered with yellow downy feathers marked with black; toes of a brownish red; the bill is small and dusky.

"This inhabits *New Holland*, where it is known by the name of *Boobook*."

This Latham himself Latinised in the *Index Orn. Suppl.* II., p. xv., 1801, under the name "*Str*(*ix*) *boobook*" thus: "S. capite lævi, corpore supra fusco subtus ferrugineo longitudinaliter maculato.

"Boobook Owl, *Gen. Syn. Sup.* II., p. 64, No. 14.

"Habitat in *Nova Hollandia*, magnitudine *Stridulæ*: *corpus* supra fusco-ferrugineum maculis flavescentibus: *gula* flava rufo maculata."

This description is not good, though the name has been accepted *without question* for a *small* Owl certainly not the size "of the Brown Owl." As quoted above, Latham gives no clue to the origin of his species and it seems doubtful whence he described it. The description appears among the large number prepared from the Lambert or Watling Drawings, and consequently Sharpe (*Hist. Coll. Brit. Mus.* (Nat. Hist.), Vol. II., p. 112, 1906), dealing with the Watling Drawings, has written: "No. 24. Watling's note is: 'This bird is about the size of the common English owl. Native name *Boo-book*.' The figure is the type of the species (*Strix boobook*), Latham's name having been founded upon it." This is probably correct, and the figure may represent the Owl commonly so known, but still it is not a good picture of this species.

When Vigors and Horsfield worked through the Linnean Society's collection of Australian Birds (*Trans. Linn. Soc.* (Lond.), Vol. XV., 1827) they admitted, p. 188, *Noctua boobook* ex Latham, giving this note: "The native name of this bird, as Mr. Caley informs us, is *Buck'buck*. It may be heard nearly every night during winter uttering a cry corresponding with that word. Although this cry is known to everyone, yet the bird itself is known but to few, and it cost me considerable time and trouble before I could satisfy myself respecting its identity. The note of the bird is somewhat similar to that of the European *cuckoo*, and the colonists have hence given it that name. The lower order of the settlers in New South Wales are led away by the idea that everything is the reverse in that country to what it is in England: and the *cuckoo*, as they call this bird, singing by night, is one of the instances which they point out. The *irides* are yellow. In his references to one of the specimens in the collection, a young male, Mr. Caley notices some variation in the colour of the *irides*."

They then described (p. 189) *Noctua maculata* with the diagnosis: "N. superne brunnea, maculis rotundis albis notata, abdomine ferrugineo-brunneo, maculis grandioribus; digitis pilosis."

A detailed description in Latin is added, and then a note: "This bird much resembles the last species. Having, however, seen several specimens of it in fine preservation, we are at present inclined to consider it distinct. The chief points on which we ground this opinion are, that the latter bird is much smaller than *N. boobook*, the colour is less ferruginous, and the white spots are much more frequent, and distinctly marked. The *fasciæ* on the tail-feathers also in our bird are more conspicuous."

No locality is given in either case, but reference to Mr. Caley indicates New South Wales as the place whence the typical birds came, and the novelty has since by common consent been accredited to Tasmania, which has been fixed as the type-locality.

When Gould worked up this group, he described a bird as *Athene marmorata*, but never figured it (*Proc. Zool. Soc.* (Lond.) 1846, p. 18), from South Australia, mainly on account of its larger size, as here quoted:

"All the upper-surface, wings and tail dark brown, obscurely spotted with white round the back of the neck, on the wing-coverts and scapularies; inner webs of the primaries at their base, and the inner webs of the lateral tail-feathers crossed by bands, which are buff next the shaft and white towards the extremity of the webs; face and chin whitish; under-surface dark brown, blotched with white and sandy-brown; legs and thighs fawn colour; bill horn colour; feet yellow.

"Total length, 14 inches; bill 1⅛; wing 9½; tail 6; tarsi 2.

"*Hab.* South Australia.

"*Remark.* Nearly allied to *Athene maculata*, but much exceeding that species in size."

Bonaparte, in the *Consp. Gen. Av.*, Vol. I., 1850, admitted *Athene maculata* (=*clelandi*), *marmorata*, *boobook* and *novæzelandiæ* and added: "*Athene ocellata*, Hombr. et Jacquin, Voy. au Pole Sud. Ois., t. 3, 2, ex Oceania. Media: brunnea, rufescenti varia; subtus rufescens, maculis magnis, rotundis, albis; gula pure alba; alis modice longis; tarsis rufescentibus; digitis cinereis, basi tantum pilosis."

This name has given trouble, as hereafter shown, as it was accepted by Sharpe in the *Catalogue of the Birds in the British Museum*, Vol. II., for the North and North-west form of this species.

BOOBOOK OWL.

In 1889, De Vis described a new species of Owl from the Bellenden Ker Range in the *Rep. Sci. Exped. Bellenden Ker*, p. 31 (and in another copy, p. 84), 1889, as follows:

"*Adult male.* Upper-surface of head and neck uniform dark brown, hind neck and back coffee-brown, with a few concealed white spots on the lateral and anterior feathers of the mantle. Lower back and upper tail-coverts uniform paler brown. Tail with two central feathers uniform, the laterals with four or five distinct or nearly obsolete pale bars on the inner web. Scapulars brown, with one or two large white median spots or bars on one or both webs. Quills externally washed with greyish-brown, the outer webs with broad obscure subrufous cross-bars; the inner webs with a few obscure transverse bars, the inner ends of those near the base forming a white spot. Wing-coverts uniform brown, a little brighter than on the head. Lores and cheeks anteriorly white, the plumes with black shafts; hinder part of cheeks and ear-coverts brown, like the head; a supraciliary stripe over the fore part of the orbit, white more or less stained with buff. Chin whitish, its median hinder feathers with brown shaft-streaks, the laterals buff with brown centres, these forming a line behind the ear-coverts. Throat rufous-brown, obscurely spotted or streaked with buffy-white. Breast and abdomen deep rufous-brown, largely spotted with white. Under tail-coverts with a median spot on both webs, and the tips brown or buffy-brown, with one or two white median spots. Under-surface of tail pale brown, with four or five more or less obsolete transverse bars. Axillaries rufous or ochreous. Under wing-coverts rufous, edge of wing buffy-white or white. Under-surface of wing silky brown, with the transverse bars of the quills in strong contrast. Legs rufous. Bill white, blackish below the nostrils. Mandible blue-black, yellow at the base. Total length 290 mm.; wing 225, tail 137, tarsus 38.

"*Adult female.* Like the male, but with the throat and upper-breast rich chocolate-brown with fulvous stripes. The tail uniform brown above and below, the quills narrowly edged with buffy-grey, and the bill black except the basal half of the culmen."

When I drew up my "Reference List" of the Birds of Australia (*Nov. Zool.*, Vol. XVIII., January 1912, p. 254) I recognised seven subspecies, thus: *Ninox boobook boobook* Latham, New South Wales, Queensland; *N. b. marmorata* Gould, South Australia, Victoria; *N. b. halmaturina* nov., Kangaroo Island (differs from *N. b. marmorata* in its darker reddish-brown coloration above, and the darker burnt sienna markings on the under-surface resemble in character those of *N. b. boobook* rather than those of *N. b. marmorata*); *N. b. maculata* Vigors and Horsfield (=*clelandi*), Tasmania; *N. b. ocellata* Bonaparte, South-west Australia (I have compared the type with a very fine series from West Australia, and find it agrees with other *Ninox* from South-west Australia); *N. b. mixta* nov., North-west Australia (type), Northern Territory (differs from *N. b. boobook* in its pale coloration and its pale under-surface with faint streaks); and *N. b. lurida* De Vis, North Queensland."

Since then I have added more forms as follows:

"*Ninox boobook melvillensis* (*Austral Avian Record*, Vol. I., p. 34, Apl. 2, 1912). Differs from *N. b. mixta* in its very red general coloration and smaller size. This is the smallest subspecies of *N. b. boobook.*

"Type, Melville Island, Northern Territory, No. 10,796.

"Range, Melville Island."

"*Ninox boobook macgillivrayi* (*Austral Avian Record,* Vol. I., p. 194, March 20, 1913). Differs from *N. b. boobook* in its smaller size and lighter coloration throughout. Total length 320 mm.; culmen 16, wing 218, tail 123, tarsus 40.

"Type, Cape York, North Queensland, No. 13,881.

"Range, Cape York."

"*Spiloglaux boobook clelandi* (*Austral Avian Record,* Vol. II., p. 74, Dec. 29, 1913). Differs from *S. b. maculata* in being very much darker brown, altogether lacking the reddish colour above. The tail is blackish, with the bars almost obsolete.

"Type, Flinders Island, 23rd November, 1912.

"Collected by Dr. J. B. Cleland."

"*Spiloglaux boobook leachi* (*ib.*). Differs from *S. b. maculata* in its larger size.

"Type, Victoria (East of Melbourne).

"*Spiloglaux boobook tregellasi* (*ib.*). Differs from *S. b. marmorata* in its much darker general coloration.

"Type, Frankston, Victoria, 13.4.1909 (North of Melbourne)."

"*Spiloglaux boweri* (*ib.*). Differs from all subspecies of *boobook.*

"Upper-surface uniform deep brown, darker on the head. Tail uniform brown, without any trace of bars either above or below; wing-coverts like the back, scapulars with a large white spot on the outer web. Primaries quite brown with obsolete bars. Under-surface deep chocolate brown, spotted with white; chin white, under tail-coverts chestnut brown, with twin white spots and tipped with dark brown; feathers round the bill as in other species, under wing-coverts brown with white spots, quills light brown with large white spots on the inner webs. Length 340 mm.; culmen 17, wing 221, tail 127, tarsus 43.

"Type, Peterson's Pocket, Cairns, North Queensland, 19.12.1884."

This last I now conclude to be De Vis's *lurida*.

I have, in consequence of the recognition of the Neozelanic forms, to note the names given to these and the Norfolk Island and Lord Howe Island birds.

In the *United States Expl. Exped.*, Vol. VIII., 1848, p. 75, Peale described *Noctua venatica* from the Bay of Islands, New Zealand. This name comes into use when the birds from the North Island are separated from those of the South Island.

When Ramsay published his *Tabular List of Australian Birds* in 1888, he added a List of species found on Lord Howe and Norfolk Islands and there described, p. 36: "*Ninox albaria* sp. nov. Specimens of a small *Ninox* from Lord Howe Island differ considerably from either of the Continental forms, *N. maculata* or *N. boobook*, and also from *N. novæ-zealandiæ*, to which latter it is most closely allied; this species, which I propose to distinguish under the name of *Ninox albaria*, may be briefly described. The face, lores, fore-head, chin and upper part of the throat in some specimens, snow-white; the general colour of the plumage rich fawn or rusty-brown, deeper in tint on the sides of the chest and under-surface and upper tail-coverts; each feather of the chest has two distinct roundish spots of white, which elongate transversely and form two detached bars on the breast, but become confluent on the flanks; the feathers of the under tail-coverts are white, with a terminal bar and centre shaft-spot of rufous brown; abdomen, legs and thighs rufous brown, paler on the inner parts; no spots on the head or hind neck; the mantle and interscapular region without spots in some, but sparingly spotted with white on the concealed parts of the feathers in other individuals. Scapulars with two broken bands of white, which sometimes take the form of oval spots on either side of the shafts of the feathers. Wings with seven to eight dull ashy bands. Centre two tail feathers without any bands, the others with about ten oblique narrow ashy bands on the inner webs only, except the outer feathers on either side, where they are just distinguishable; a few spots of white on the concealed portions of the rump and upper tail-coverts. Bill black, feet dull yellowish brown; bristles brown. Length, 12 inches; wing, 8 inches; tail 6 inches; tarsus, 1.7 inch; bill from fore-head, 1 inch. Some of the New Zealand specimens come very close to the Lord Howe Island birds, but lack the white face, lores and chin. Should they eventually prove to be identical, this will form an interesting link, connecting the avifauna of the two Islands. The Norfolk Island bird is said to be *Ninox boobook*, but it is more likely to prove to be *Ninox novæzealandiæ*, or perhaps the present species."

Many years later I received specimens of the Norfolk Island Owl, and these proved to be quite unlike the Lord Howe Island form and very nearly agreed with the Tasmanian one. I described this in the *Austral Avian Record*, Vol. I., p. 120, Dec. 24, 1912, under the name *Ninox boobook royana*, writing: "Differs from *N. b. boobook* in its smaller size and the under-surface covered with small spots."

I have now detailed the names given to Australian and New Zealand birds, but would note that probably many of the forms recognised as species from localities north and east of Australia would rank as subspecies only of the present species, were series available. This remark is compelled by the recognition of the peculiarities of the *maculata*=*clelandi* form, and also of the *boweri*=*lurida* (?) when contrasted with the *melvillensis* form, as I will show later.

The typical Neozelanic bird is very dark above, almost unspotted, and tail feebly barred: the under-surface is very heavily striped with longitudinal dark reddish-brown markings; in this state it is comparatively easily distinguished from Australian birds. However, North Island birds are not quite so dark, and below, especially on the abdomen, the darker markings coalesce so as to leave the white markings in the form of spots: this is the form I recognise under the name of *venatica* Peale, and this is very like Tasmanian birds, so much so that odd specimens cannot be easily differentiated, though a series differs. This indicates that no more than subspecific rank can be granted to the many Australian races. As a matter of fact, the Tasmanian bird is more easily separable from the New South Wales bird than the former is from the Neozelanic bird. I have often considered the view that two species might be recognised in Australia, the *boobook* form and the *maculata*=*clelandi* form. The erratic occurrence of the latter encouraged this view, and the recognition of the two in Victoria seemed further to confirm this. The receipt of additional material and continued study has enabled me to negative this aspect, and the only conclusion is that one species only is here concerned. It is certain, however, that many subspecies must be accepted, though not all that have been named. I, however, have felt compelled to give four plates in order to substantiate my conclusions as to the variability of the species and the peculiarities of the forms. These four subspecies are also described in detail, so that here I will only make comparative remarks and would preface these by observing that it will not advance science to criticise these without careful study, as was done in the case of other Australian Owls, as will hereafter be shown. It will be best to consider these from the earlier described forms first.

BOOBOOK OWL.

Spiloglaux novæseelandiæ novæseelandiæ (Gmelin).
Queen Charlotte Sound, New Zealand.
South Island of New Zealand.

This is the darkest form above and below, the under-surface generally appearing striped with white.

Spiloglaux novæseelandiæ venatica (Peale).
Bay of Islands, New Zealand.
North Island of New Zealand.

This form is close to the South Island one, but the white markings on the under-surface, especially on the abdomen, take the form of spots, and consequently closely resemble the Tasmanian form.

The names *fulva* Latham and *fulva* Forster, being founded on the same specimen as Gmelin's name, fall as absolute synonyms.

Spiloglaux novæseelandiæ boobook (Latham).
New South Wales.

This name has been used for over one hundred years without question, yet it seems to be rather a doubtful one. As I cannot *prove* its invalidity at the present time, I maintain it, but with reserve. The *boobook* of New South Wales is much paler above than the Neozelanic form, and has the under-surface striped with paler streaks, while the upper-surface is more spotted with white. It is easily distinguished from the Neozelanic bird, but there are forms in Australia just as distinct from it as it is from the type subspecies.

Spiloglaux novæseelandiæ clelandi Mathews.
Tasmania and Flinders Island.

As noted previously by Vigors and Horsfield, this Owl is darker and smaller than *boobook*, and the under-surface is spotted with white, not striped as in that phase. This is so distinct from *boobook* that it has been continually regarded as a species, and no comparison has been made with the Neozelanic birds. As noted above, some specimens are, comparatively speaking, indistinguishable from the Northern race of the latter. From Victoria, "*maculata*" has been recorded more than once, and I have received specimens which closely resemble the Tasmanian form. Other birds from Victoria are of the *boobook* style, and at the time I received these I was of the opinion that two species must be confused. I therefore named these two forms as *leachi* and *tregellasi*, the former like *maculata*=*clelandi*, but larger, the latter more nearly agreeing with *marmorata*, but darker. I also named the Flinders Island bird, as it was much darker than the Tasmanian one. More material is needed to substantiate this island race, and I am neglecting it in this place, though my review of the species makes it appear probable that it will constitute a valid race. I have figured and described this Flinders Island bird and this will now stand for the race here recognised, whose range will be Tasmania and Flinders Island.

The reason for the rejection of Vigors and Horsfield's name "*maculata*" I have just given. Kerr named a variety of the New Zealand Owl *Strix novæseelandiæ maculata* in 1792, so it is impossible to maintain Vigors and Horfield's name. It is, moreover, not certain that their type came from Tasmania, so that the usage of *clelandi* determines the matter exactly.

Spiloglaux novæseelandiæ leachi Mathews.

Victoria.

The Owls from this colony have been regarded by previous workers as *boobook* or *maculata=clelandi*, and as a whole they are certainly neither. They cannot be classed as *boobook*, as they are all obviously darker, while they are all larger than *maculata=clelandi*, and many of them differ on the under-surface, showing striping rather than spotting. Consequently the only alternative is their recognition as a valid subspecies. Another way, much more cumbersome under the circumstances, would be their recognition as intermediates between the two forms mentioned, and they would then be classed as:

S. n. boobook—clelandi.

I approve of the former method in this case, but just indicate the complexity of the species.

Spiloglaux novæseelandiæ marmorata (Gould).

South Australia.

The birds from this colony were differentiated by Gould as similar to *maculata* but larger: this they undoubtedly are, but they are more like the Victorian birds I called *tregellasi*, having the under-surface half striped and half spotted, or, as Gould's name implies, "marbled." They are lighter than the Victorian or Tasmanian birds, and could be regarded as intermediate between the former and the West Australian birds, which are still lighter. This could be stated thus:

S. n. leachi—ocellata,

but here again the simple trinomial is much preferable.

I described the Kangaroo Island bird as different from the mainland South Australian bird, especially as regards the under-surface markings, but here I minimise this view, having regard to the Victorian variation, though again the constancy of island races of this species necessitates the caution that this degradation may be only a temporary one. I have figured and described this Kangaroo Island bird, and this must be taken as representative of the South Australian race.

Spiloglaux novæseelandiæ ocellata (Bonaparte).

South-west Australia.

This form is lighter than the three last named and comes closer to the typical *boobook* from New South Wales. It has the under-surface striped, no spotting or marbling being apparent. It is slightly darker than the New South Wales form and has been generally called *boobook.* As showing the variation observed in rare cases, Ashby has written of a specimen secured at Bayswater, near Perth: "The coloration is much darker than any specimen of this species I have seen in S(outh) A(ustralian) collections. The usual spotting is almost entirely absent, and the tail is not barred."

The name *ocellata* was used by Sharpe for the North-west Australian bird, but upon examination of the type it was found to agree exactly with South-west Australian specimens and to appreciably differ from any (and a large series were available) bird from the North-west of Australia or Northern Territory.

Spiloglaux novæseelandiæ mixta Mathews.

Parry's Creek, North-west Australia.

This is the name to be used for the form crossing North Australia from Cloncurry River to the North of West Australia. It is the most pallid form, and has been recognised by all workers under the name *ocellata*, as mentioned above. It is very pale above and is streaked with pale rufous brown below, in some cases the streaking being so light as to give the impression of a white under-surface. It varies a little in shade, and it is possible more than one subspecies is represented in the stretch of country outlined, but there is not sufficient material available to indicate such.

Spiloglaux novæseelandiæ melvillensis Mathews.

Melville Island, Northern Territory.

This is an island form which must be admitted as it cannot be lumped with the preceding, the nearest geographical race, and it appreciably differs from all others. It is a small dark race, recalling *maculata=clelandi,* and not at all like the mainland form. I have mentioned that probably *halmaturina*, which I here disallow, is a valid subspecies and this subspecies emphasizes this suggestion. I will again note the frequency of constant island forms of this species around Australia and also their prevalent darkness.

Spiloglaux novæseelandiæ lurida De Vis.

Mid Queensland.

I have described and figured the bird I named *Spiloglaux boweri,* which I now conclude to be De Vis's *lurida.* I wrote: "Differs from all subspecies of *boobook,*" and this race is a very striking one. It is perhaps a little variable, but my specimens are very dark above, unspotted and tail *unbarred*. All the specimens of *boobook* I had examined had the tail-feathers more or less barred, and De Vis's description gives the latter feature, but his second bird, a female, agrees with my type male. The interposition of this form almost between *boobook* and *mixta*, both comparatively light forms, is very interesting and emphasizes my contentions regarding "islands" on the Australian continent. Here we have practically an island form confined to the Bellenden Ker "Island," though this is not separated by water. The nearest bird as regards the upper coloration is *Ninox goldiei* of Sharpe from Goodenough Island, Solomon Group.

Spiloglaux novæseelandiæ macgillivrayi Mathews.

Cape York Peninsula.

I have a nice series from this locality and find they approach the preceding in the lack of bars on the tail, but are very much lighter in coloration both above and below.

North commented thus, with regard to *S. n. lurida*:

"This diminutive representative of *N. boobook*, in the tropical scrubs and mountain ranges of North-eastern Queensland, is in contradistinction to its northern and north-western ally *N. ocellata* (=*mixta*), distinguished by the intensely rich colouring of its plumage. This is more apparent on the throat, upper portion of the breast, axillaries, and under-wing coverts." North did not then know the present subspecies, or he might have remarked on the peculiarity of this more northern form. The series show the constancy of the subspecies.

Spiloglaux novæseelandiæ everardi, subsp. n.

Central Australia.

Specimens from Central Australia differ from typical birds in being paler and in having the throat and face white to a larger extent. This has been previously indicated by North, Keartland and White, so that I here furnish a name for this form. The type was collected by Captain S. A. White in the Everard Ranges, Central Australia, on the 2nd August, 1914.

Spiloglaux novæseelandiæ albaria Ramsay.

Lord Howe Island.

I have given Ramsay's description and notes concerning this form. It is comparatively near *boobook*, though Ramsay said it wasn't, and is quite unlike typical *novæseelandiæ*, notwithstanding his remarks. It is, peculiarly, a *light* island form and not a *dark* one, and a specimen has been in the British Museum for over fifty years, packed away amongst the *boobook* birds. Its white face is rather distinctive.

BOOBOOK OWL.

Spiloglaux novæseelandiæ royana Mathews.
Norfolk Island.

This bird is the best instance of the failure of theory in connection with this species. Ramsay's suggestions have all proved valueless, as the bird is a mimic almost exactly of the Tasmanian *maculata*=*clelandi.* I find that Dr. Crowfoot presented a specimen to the British Museum in 1885 and it was labelled "*maculata*" and packed away with the Tasmanian specimens. In view of the extraordinary difference between this and the preceding, I am again observing that probably island forms are very constant and that *halmaturina* will soon be revived.

It is interesting to note that in the *Journ. fur Orn.*, 1909, Dr. Sassi, of Vienna, reported upon a collection of birds made by E. Weiske in North Queensland. Criticising these impartially, he recorded one specimen as *Ninox boobook* Lath. ? and the other as *Ninox novæzealandiæ* Gm. ? He indicated how alike the specimens were, and suggested that a species very close, if not identical with, the New Zealand Owl existed in Australia. He also noted the similarity with the *maculata*=*clelandi* form.

From Timor, Savu, etc., Owls are known resembling the Northern Australian form I have called *mixta*, and these certainly seem only subspecies and referable to the present species.

GENUS—HIERACOGLAUX.

HIERACOGLAUX Kaup, Isis 1848, col. 768 .. .. Type *H. connivens.*

Also spelt—

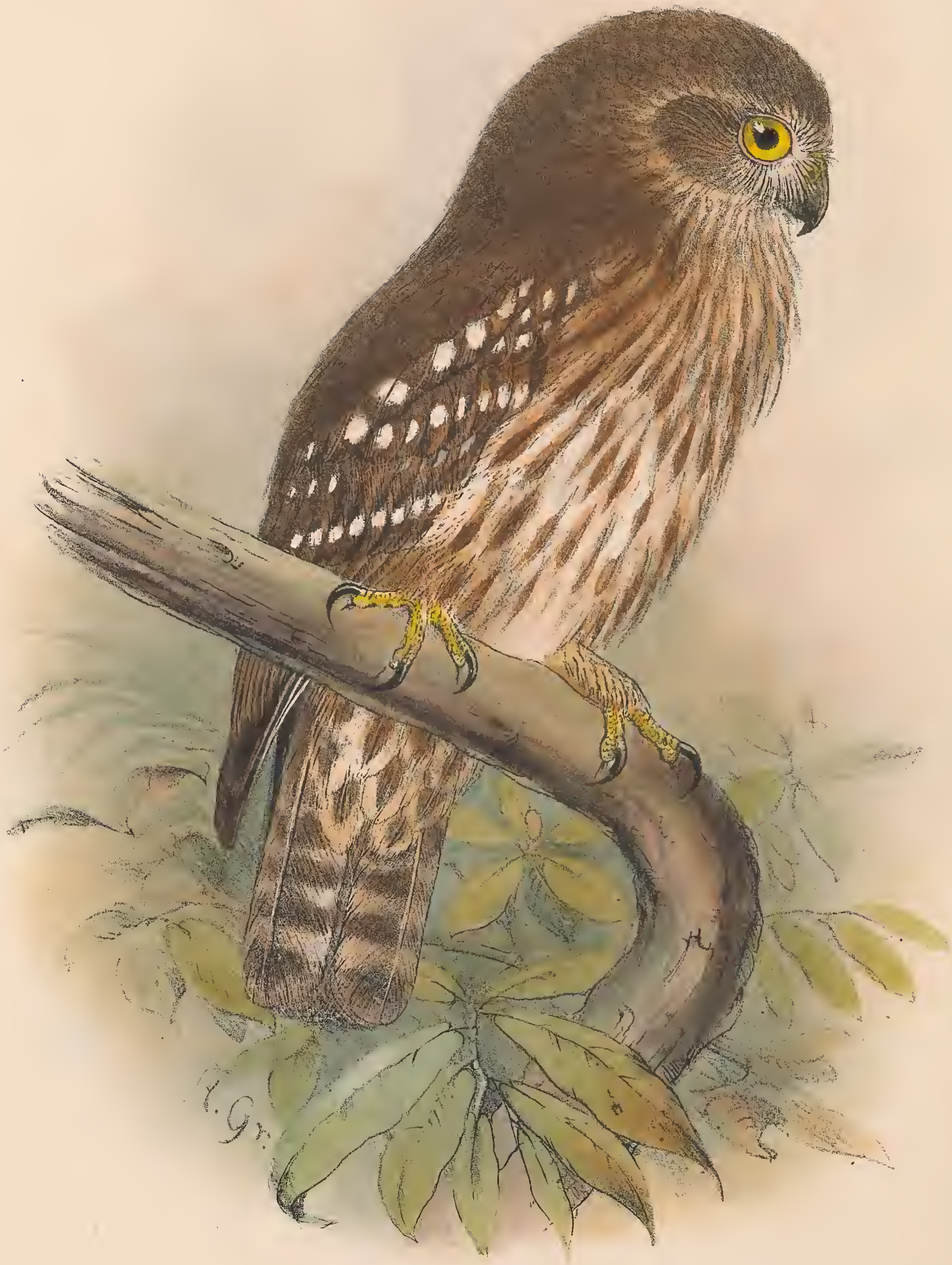
Jeraglaux Kaup, Archiv. fur Naturg. 1851, p. 104.
Ieraglaux, *id.*, Jardine's Contr. Orn. 1852, p. 107.
Ieroglaux Bonaparte, Rev. Mag., Zool. 1854, p. 543.
Zeraglaux Gray, Cat. Gen. Subgen. Birds, p. 8, 1855.
Hiracoglaux Heine, Nomencl. Mus. Heine, p. 248, 1890.

LARGER Strigine birds, with short bills, medium wings, long tails, stout legs and strong feet.

Compared with the preceding genus, the birds are larger, though similarly marked, the bill is stouter and more prominent, the nostrils less directed forward, not so visible from the frontal view and less obscured by bristles from the side view. The wing is longer, with the wing formula similar. The tail is longer and practically straight, but equally proportional.

The legs, however, are of practically the same length, but much stouter and more powerful and therefore comparatively shorter. The toes are much longer and very stout and are about the same length as the tarsus.

The two genera, which have been commonly confused, can be separated at once by the difference in the formation of the feet; and that internal characters easily recognisable will be noted upon examination seems indubitable.



H. Grönvold. del.

Witherby & C°.

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HIERACOGLAUX OCCIDENTALIS.

(*WESTERN WINKING. OWL*).

No. 317.

HIERACOGLAUX CONNIVENS.

WINKING OWL.

(Plate 264.)*

Falco connivens Latham, Index Ornith., Suppl. II., p. xii., 1801: in Nova Hollandia=New South Wales.

Winking Falcon, Latham, Gen. Synops. Birds, Suppl. II., p. 53, 1801.

Falco connivens Latham, Index Ornith., Suppl. II., p. xii., 1801.

Buteo connivens Vieillot, Nouv. Dict. d'Hist. Nat., Vol. IV., p. 481, 1816.

Noctua frontata Lesson, Traité d'Orn., p. 106, 1830: New South Wales; Pucheran, Rev. Mag. de Zool. 1849, p. 21.

Athene ? fortis Gould, Synops. Birds Austr., pt. iii., pl. (49), April 1838: New South Wales; *id.*, Proc. Zool. Soc. (Lond.) 1837, p. 141, Dec. 1838; Witmer Stone, Austral Av. Rec., Vol. I., p. 147, 1913.

Surnia fortis Selby, Cat. Gen. Subgen., Types Aves, p. 4, 1840.

Athene connivens Gray, Ann. Mag. Nat. Hist., Vol. XI., p. 189, 1843; *id.*, Genera Birds, Vol. I., p. 35, 1845; Gould, Birds Austr., Vol. I., pl. 34, 1848; Bonap., Consp. Gen. Av., Vol. I., p. 43, 1850.

Falco glaucopis " Lath. M.S." Gray, Ann. Mag. Nat. Hist., Vol. XI., p. 189, 1843; *nom. nudum.*

Athene frontata Gray, Genera Birds, Vol. I., p. 35, 1845.

Jeraglaux connivens Kaup, Archiv. fur Naturg. 1851, p. 105.

Ieraglaux connivens Kaup, Contr. Orn. (Jardine) 1852, p. 109.

Ieroglaux connivens Bonaparte, Rev. Mag. de Zool. 1854, p. 543.

Noctua connivens Schlegel, Mus. de Pays-Bas, Vol. II., Striges, p. 39, 1863.

Hieracoglaux connivens Gould, Handb. Birds Austr., Vol. I., p. 71, 1865; Masters, Proc. Linn. Soc. N.S.W., Vol. I., p. 45, 1876; Mathews, List Birds Austr., p. 115, 1913.

Ninox connivens Sharpe, Ibis 1875, p. 258; *id.*, Cat. Birds Brit. Mus., Vol. II., p. 175, 1875; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 178, 1877; Broadbent, Proc. Roy. Soc. Queensland, Vol. III., p. 25, 1887; Ramsay, Tab. List Austr. Birds, p. 2, 1888; *id.*, Cat. Austr., Striges, p. 18, 1890; North, Austr. Mus. Cat., no. 12, p. 25, 1890; *id.*, Rec. Austr. Mus., Vol. I., p. 111, 1891; *id.*, Austr. Mus. Cat., no. 4, p. 19, 1898;

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* The Plate is lettered *Hieracoglaux occidentalis.*

Hall, Key Birds Austr., p. 6, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 46, 1901; D'Ombrain, Emu, Vol. IV., p. 128, 1905 (Vict.); Berney, *ib.*, Vol. V., p. 19, 1905 (N.Z.); Hill, *ib.*, Vol. VI., p. 177, 1907 (Vict.); Barnard, *ib.*, Vol. VII., p. 187, 1908 (Q.); Mathews, Handl. Birds Austral., p. 43, 1908; Sassi, Journ. fur Orn. 1909, p. 366 (N.Q.); North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 303, 1912; Macgillivray, Emu, Vol. XIII., p. 153, 1914 (N.Q.); Cheney, *ib.*, Vol. XIV., p. 204, 1915 (Vict.).

Ninox peninsularis Salvadori, Ann. Mus. Civ. Gen., 1st Ser., Vol. VII., p. 992, 1875: Cape York, N. Queensland; Sharpe, Rep. Sci. Exped. Alert, p. 11, 1884; Ramsay, Cat. Austr., Striges, p. 20, 1890; North, Austr. Mus. Cat., no. 4, p. 21, 1898; Hall, Key Birds Austr., p. 6, 1899; Mathews, Handl. Birds Austral., p. 43, 1908; Barnard, Emu, Vol. XI., p. 22, 1911 (N.Q.); Macgillivray, *ib.*, p. 213, 1912 (N.Q.); North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 308, 1912; Macgillivray, Emu, Vol. XIII., p. 154, 1914 (N.Q.).

Ninox connivens—occidentalis Ramsay, Proc. Linn. Soc. N.S.W., 2nd Ser., Vol. I., 1886, p. 1086, 1887, Derby: North-west Australia; *id.*, *ib.*, Vol. II., p. 166, 1887; *id.*, Cat. Austr., Striges, p. 21, 1890.

Ninox connivens peninsularis Ramsay, Tab. List Austr. Birds, p. 2, 1888; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 47, 1901; Mathews, Nov. Zool., Vol. XVIII., p. 256, 1912.

Ninox connivens occidentalis Ramsay, Tab. List Austr. Birds, p. 2, 1888; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 47, 1901; Hartert, Nov. Zool., Vol. XII., p. 209, 1905 (N.T.); Mathews, Nov. Zool., Vol. XVIII., p. 255, 1912.

Hiracoglaux connivens Heine, Nomencl. Mus. Hein., p. 248, 1890.

Ninox occidentalis North, Austr. Mus. Cat., no. 4, p. 23, 1898; Hall, Key Birds Austr., p. 6, 1899; North, Trans. Roy. Soc. S.A., Vol. XXII., p. 129, 1899; Hall, Emu, Vol. III., p. 41, 1903 (N.-W.A.); Mathews, Handl. Birds Austral., p. 43, 1908; *id.*, Emu, Vol. IX., p. 5, 1909 (N.-W.A.); *id.*, *ib.*, Vol. X., p. 108, 1910 (N.-W.A.); Hill, *ib.*, Vol. X., p. 268, 1911 (N.-W.A.); North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 309, 1912; Barnard, Emu, Vol. XIV., p. 42, 1914 (N.T.).

Ninox connivens connivens Mathews, Nov. Zool., Vol. XVIII., p. 255, 1912.

Ninox connivens suboccidentalis Mathews, *ib.*: Port Keats, Northern Territory.

Ninox connivens addenda Mathews, Austral Av. Rec., Vol. I., p. 120, Dec. 24, 1912: South-west Australia.

Hieracoglaux connivens connivens Mathews, List Birds Austr., p. 115, 1913.

Hieracoglaux connivens peninsularis Mathews, *ib.*

Hieracoglaux connivens occidentalis Mathews, *ib.*

Hieracoglaux connivens addenda Mathews, *ib.*

Distribution. Australia (not Tasmania).

Adult female. General colour above earth-brown, including the top of the head, entire back, wings and tail, the scapulars irregularly marked with white; greater upper wing-coverts marked with ovate spots of white on the outer webs; bastard-wing and primary-coverts uniform brown rather darker than the back; primary- and secondary-quills earth-brown like the back with pale smoke-brown or white cross-bars, or large ovate spots chiefly on the inner webs, the innermost secondaries marked with white on both webs; tail earth-brown like the back, barred with pale smoke-brown, becoming dull white on the inner portion of the inner webs and at the tips; base of fore-head, space surrounding the eye, cheeks and throat white with black hair-like tips to the feathers; under-surface, including the under wing-coverts and under tail-coverts tawny-brown, the feathers edged with white, rather broadly on the abdomen and much more so on the under tail-coverts; the margins to the under wing-coverts buff; greater series of under wing-coverts, quill-lining and lower aspect of tail pale brown barred with white. Bill black and horn; cere yellowish-grey; eyes yellow; feet yellow. Total length 410 mm.; culmen 20, wing 281, tail 156, tarsus 41. Figured. Collected at Port Keats, Northern Territory, in January, 1907, and is the type of *Hieracoglaux connivens suboccidentalis* (Mathews).

Adult male. Similar to the adult female.

Nestling covered with white down.

Immature take on the adult plumage almost at once.

Nest. A hole in a tree or in a rabbit-burrow.

Eggs. Clutch, two or three; white and roundish, 45 to 48 mm. by 40 to 42.

Breeding-season. August, September, October.

When Latham examined the drawings made by Watling of New Holland birds, he saw one of a strange facies with a note by the artist: "This Bird has a wonderfull power of contracting and dilating the iris and pupil." Latham determined this to be a species of *Falco*, and gave the specific name of *connivens* to it.

Latham's full description of the drawing reads (*Gen. Synops.*, Suppl. II., p. 53, 1801): "Winking F(alcon). Size of the *Ringtail*; length eighteen or nineteen inches; bill pale, with a black point; irides yellow; the general colour of the plumage is a deep chocolate-brown, spotted with rusty-white on the lower part of the neck behind, and on the axillaries of the wings; the quills are obliquely, and the tail-feathers transversely barred with the same; the under-parts, as far as the breast, dirty yellowish-white, with short dusky streaks; legs covered to the toes with pale ash-coloured feathers.

"Inhabits *New Holland*, but no history annexed, further than that it has a wonderful faculty of contracting and dilating the iris, and that the native name is *Goora-a-gang.*"

As Sharpe (*Hist. Coll. Nat. Hist. Brit. Mus.*, Vol. II., p. 110, 1906) noted, Watling wrote the native name "Goo-ree-a-gang."

It was, of course, certain that the inaccurate generic location would be the cause of the re-naming of the bird, so that when Gould received this Owl from New South Wales he called it *Athene* (?) *fortis*. It had, however, been previously named by Lesson *Noctua frontata*, but this name was not recognised as applicable for many years, until Pucheran re-examined the types of Lesson's species.

In 1843 Gray and Strickland, in conjunction with Gould, examined the Watling Drawings; they recognised the drawing of *Falco connivens* as applicable to the Owl named by Gould *Athene* (?) *fortis*, and immediately Gould, a firm believer in absolute priority, accepted the Lathamian name and sank his own as a synonym. He moreover wrote an apology as follows: "It will be seen, on reference to the synonyms, that I described this bird in the 'Proceedings of the Zoological Society' under the specific name of *fortis*, but I have since ascertained, through the kindness of the late Earl of Derby in affording me the use and inspection of the three volumes of drawings of Australian Birds, formerly in the possession of the late A. B. Lambert, Esq., that it is identical with the Winking Falcon of Latham; any seeming inattention on my part in describing an apparently new Owl without consulting that author will, I hope, be readily excused, as few ornithologists would think of looking for the description of this bird under the genus *Falco*. It is due to the acumen of the late Mr. Strickland that, by means of the drawings alluded to, the present and other species described by Latham have been identified, a circumstance which has caused *Aquila fucosa* to become *A. audax*; *Falco frontatus*, *F. lunulatus*; *Strix personata*, *S. novæhollandiæ*, etc.; unfortunately I did not obtain the loan of these drawings until my work was far advanced, otherwise the errors I now correct would not have occurred."

It will be gathered from this extract that Gould did not consider the drawings in the light put forward by some of his most ardent disciples who, without seeing them, called them the doubtful drawings of a botanist. Again, North actually quotes the above extract apparently as valuable and interesting information and then urges the rejection of the names founded upon these drawings. Of course, the action of the above writers was due to prejudice and ignorance of the drawings and their history. I am publishing copies of some of the Watling Drawings in the *Austral Avian Record*, and study of these will tend to dispel doubts as to the validity of the Lathamian names. As above recorded, Gould himself was never in any doubt as to their applicability.

Not many notes have been recorded as to the life-history of this species. Gould's notes are extremely brief: "Brushes, wooded gullies, and the sides of creeks are its favourite places of resort; it is consequently not so restricted in the localities it chooses as the *Hieracoglaux strenuus*, which I have never known to leave the brushes. It sallies forth early in the evening, and even flies with perfect use of vision during the mid-day sun, when roused and driven from the trees upon which it has been sleeping. I have frequently observed it in the daytime among the thick branches of the *Casuarinæ* which border the creeks."

Mr. T. P. Austin has sent me the following nice note from Cobbora, New South Wales: "The only place where I have seen this species is within the boundary of this Estate, and it is fairly common here. I think I could find at least one pair almost any day I wished, as they always remain about their nesting-places during the day throughout the year. Just at dusk they sally forth to feed, sometimes just as the sun sets, and at this time of the evening I have often seen them about my house. In my garden I was very interested one evening in watching one catching and eating bats. I saw the Owl come and perch upon a grape vine trellis within a few yards of me: it remained there a few minutes, then flew up into the air a few feet, and without any apparent exertion caught a bat in its claws, then returned to the trellis and ate it within a few minutes; three times I saw the Owl do this, and then it flew away. I was not able to see if the bats were swallowed whole: if not, from the short time taken to devour them, they must have been gulped down in rather large pieces. The easy manner in which this bird caught the bats, it just looked as though the latter were trying to be caught. This is one of the birds which produces the note 'mopoke': I have seen them just before dark uttering it, and upon another occasion, knowing one of their nesting hollows in a large red gum-tree on the bank of the Talbragar River, I went down to examine it. Before climbing the tree I threw a few sticks to try and flush the Owl if sitting, but saw nothing of her, so turned away to gather some more sticks: while doing so I heard a most peculiar noise, which appeared to come from the opposite bank of the river; I turned round, thinking it was a small dog, as the noise resembled a half bark, half growl, such as a small dog utters when very frightened, but I could see nothing nor could I hear anything. Thinking I must have been mistaken, I threw another stick, then heard the same peculiar noise again. I then knew it must be the Owl, and just then a pair of *Ptilotis penicillata* arrived and in their usual manner soon showed me the *Ninox*. When nearly up to the nest one of the birds came and perched upon a branch within forty feet of me, and started the peculiar growling noise immediately, which slowly changed into the well-known call-note 'mopoke,' uttered about half a dozen times at intervals of a few seconds, and in a very low tone. I just kept quite still and watched her for a few minutes, when she flew into a neighbouring tree. While I was sitting beneath the tree blowing the eggs, the other Owl arrived, and the two of them then perched together, and held forth the note 'mopoke,' 'mopoke,' 'mopoke,' about twenty times very quickly and loudly, such as I had never heard it before. It sounded so weird to hear this well-known night sound in broad daylight. I have examined many of their nesting hollows, both with eggs and young; when the latter are nearly feathered, they are extremely fat, giving them the appearance of being much larger than their parents, and about this period the nesting hollow is a stinking mass of filth. They usually lay three eggs, and when the young are first hatched they look like a ball of snow-white down."

D'Ombrain, in the *Emu*, Vol. IV., p. 128, 1905, writing about the birds of the Casterton District, Victoria, records: "I know very little about the habits of this Owl, though the species is fairly plentiful here. Probably their general grey colour saves them from detection. These birds are frequently caught by the legs in rabbit traps. I have had two live specimens so taken. One had a dislocated 'knee,' which I reduced. On two subsequent occasions it was re-dislocated and reduced, till finally it became so thickened and deformed I decided to kill the bird. For this purpose I gave it three doses at different times of prussic acid on meat. Result, *nil.* Then I gave it arsenic twice, and still the bird lived, until finally I chloroformed it and skinned it. It had grown quite tame. The irides are a beautiful bright yellow, and eyes brighter and larger than the Boobook's, and constantly 'winking' (conniving), hence the specific name. The legs are short, thick and powerful. The note or cry of this Owl is exactly like that of the Boobook."

Hill mentions (*Emu*, Vol. VI., p. 177, 1907): "One pair nested regularly in a hollow branch not far from the house (Victoria). Last year one of the birds unfortunately was shot before the young had left the nest, and although the other remained in the vicinity of the tree for some time, both the young died when nearly old enough to leave the nest."

From the *Austr. Mus. Spec. Cat.*, No. 1, Vol. III., p. 305, I quote the following item. Writing from Cullenbone, Mudgee, New South Wales, on the 22nd May, 1907, the late Mr. J. C. Cox remarked: "A strange night bird has made an appearance in this neighbourhood for about a couple of months, and its cries have puzzled those who have heard it. It was thought at first to be a fox barking. The cry is very like a dog barking, so much so that it starts the dogs. It is not the bark of a common dog, but more like that of a Newfoundland or St. Bernard. The bird repeats it twice at intervals in a bass tone, 'ouf, ouf.' When the birds are in pairs the cry of each is dissimilar, probably being male and female. Sounds travel a long way on a calm night, and the cry of this bird is heard nearly half a mile away. Three men went to look for the cause of the noise, and found it came from a tree-top. Firing into the tree, two large birds flew out, but it was too dark to make a successful shot or see the birds distinctly. It is an Owl, I should think, but what species? There are several of the large Owls at Mount Wilson, but I never heard a cry similar to this one, and I have never heard it here before, nor has anyone else so far as I can learn." On the following day Mr. Cox wrote: "I have secured the 'Barking Owl,' and it turns out to be *Hieracoglaux connivens*, and I am sending it to you. There was nothing in its stomach except caterpillars and mantis, but there was rabbits' fur on its talons." Mr. K. H. Bennett, in 1886, wrote: "*Ninox connivens* was formerly rather plentiful along the banks of the Lachlan and Murrumbidgee Rivers, frequenting the dense clumps of Acacias fringing the banks, and just about sundown, and before leaving its retreat, its deep sepulchral 'hoot, hoot,' uttered at intervals of a few minutes, would often be heard. Usually it was met with in pairs, and was exclusively confined to the vicinity of the river banks, never being found in the timbered back country or out on the plains. I have not seen anything of this species for many years."

Mr. G. A. Keartland, of Melbourne, Victoria, added: "Winking Owls (*Ninox connivens*) are sometimes seen in the vicinity of Melton, Victoria, where they pass the day in the crevices between the rocks, or in the thick foliage of the bushes on the margin of the creeks. Twice I disturbed them from rabbit burrows in the bank of the river, when using ferrets for rabbits. Mr. Alex. M'Innes dislodged one from between two rocks on the Werribee River, and on examining the spot the bird had just left, discovered a fresh egg lying on a few dry gum leaves. Another friend, Mr. Percy Bond, informed me he found an egg of this bird in a rabbit-burrow, about eighteen inches from the entrance, from which his ferret had just driven the Owl, which was shot."

Mr. Tom Carter has given me the following account: "The Winking Owl is apparently a rare bird in West Australia, as the first specimen seen by me was after residing twenty-six years in various parts of the state. I was near Lake Muir in the south-west at the time, and was passing through some heavy Jarrah and Red Gum timber, close to the old stockyard of a long established station, about sundown, when I caught a glimpse of a large brown bird that I took to be a Brown Hawk at first. Seeing it settle in the upper branches of a tree, I took an observation of it through my binoculars and at once saw that it was a large Owl peering warily at me, and evidently about to fly further. However, I secured it, much to my pleasure at obtaining a bird never before seen. It weighed 2 lbs. and measured 42 inches expanse of wing. Total length 17 in.; wing 12¾; tarsus 2 inches. It was an adult male. I showed it to the residents at the homestead, who said they had never seen such a bird, as did also several of the old settlers in that district, who were constantly out with gun or rifle."

Barnard, reporting upon the birds of the MacArthur River, Northern Territory (*Emu*, Vol. XIV., p. 42, 1914) wrote: "These birds were found roosting in the brush during the day. In the nesting-season the female remains in the nesting hollow during the day, while the male roosts in the branches of a neighbouring tree. He often attracts attention by uttering a low growl as a person passes. The female can be flushed from the hollow by hitting the butt of the tree with a tomahawk."

From Cape York, Barnard (*Emu*, Vol. XI., p. 22, 1911) recorded under the name *N. peninsularis*: "These birds are numerous both in forest and in scrub (their note exactly resembling that of *Ninox connivens*) and were breeding freely. Unfortunately, each of the nests found contained a pair of young birds, with a single exception, where there was only one nestling. When the female is in the hollow, the male roosts in the branches of an adjoining tree, and on observing a person passing utters a loud growling note, thus drawing attention to the tree containing the nest. On one occasion I observed one of these Owls roosting in the branches of a tree and holding in its claw a small Fruit Pigeon (*L. superba*). On being flushed it dropped the Pigeon, which appeared to have just been killed. This was the only Owl observed, but the note of another species was frequently heard at night—a note resembling that of *Strix delicatula*. These birds breed very early, all the nests containing young by the end of September."

In the *Emu*, Vol. XIII., p. 153-4, 1914, Macgillivray gave a splendid account of North Queensland birds, reported upon by Mr. M'Lennan and recorded as follows:

"*Ninox connivens*. Winking Owl. This bird was heard calling by Mr. M'Lennan at his first camp on the Cloncurry River, and was afterwards found to be numerous throughout the Gulf country. At Sedan, on 22nd February, 1910, he imitated the call, when the bird flew to a tree at the back of his camp, and was shot and skinned. The call of this bird sounded like 'Hoo, wuk, wuk,' uttered in a fairly low key. The iris was yellow; bill black, cere greenish-yellow; feet light orange. The stomach contained grasshoppers and beetles. On the 9th March a pair was shot and skinned. The female measured 16 inches and the male 17 inches. The stomach contents were the same as in previous specimen. Seven worm-like parasites were found under the skin between the eyes, each measuring 2¼ inches by 1/32 inch. When camped on the Leichhardt, fourteen miles from Caloola Station, Mr. M'Lennan made the following note: '13th June, 1910. Heard a most peculiar call about 11 p.m. in the timber about 200 yards from the camp, so strolled out to investigate and found it was uttered by a bird perched on a dry tree. It proved to be a Winking Owl. The call, as near as I can give it, was "Karr, karr, karr, karr, koowook!" The stomach contained a half-digested bat and some grasshoppers.' '14th June, 1910. Heard call like that of a Wood-Duck again last night; located the bird, and found it to be a Winking Owl.' '29th June, 1910. On Leichhardt River, 20 miles beyond Augustus Downs, heard Winking Owls calling through the night. At dusk the call is "Hoo, wuk, wuk," and later on through the night "Karr, karr," and another call, "Chirr, chirr," in a very high key. They were heard for the last time where the Gregory divides into two channels, about twenty miles from Burketown. Skins of this bird were submitted to Mr. North, of the Australian Museum, who pronounced them to be indistinguishable from specimens of *N. connivens* obtained in New South Wales. Mr. Mathews considers them to be identical with the Northern Territory birds. The breeding-season is in the spring months.'

"*Ninox peninsularis.* Cape York Owl. This species is very distinct, being shorter and darker in colour than the preceding. When camped in the scrub at Cape York, Mr. M'Lennan made the following note: '20th December, 1910. *Ninox peninsularis* came along again to-night and when I imitated its call it became wild and flew at me several times, coming to within eighteen inches of my head. This occurred on several nights. The call was a repeated "Kow, kow." This assumed quite a comical aspect when the bird, perched on the ridge of my tent, looked down at me with an angry expression and uttered the word "Kow."' The first nest containing eggs was found on the 6th August, 1911, at Lockerbie. From then the nesting-season extended until the end of September. In this time fifteen nests were examined, containing either eggs or young. These nests were in large open hollows, usually in big tea trees (*Melaleuca*) at an average height of about 40 feet from the ground. The hollows averaged in depth about two feet, and were of an average diameter of about a foot. Many were bedded with a good layer of finely chipped rotten wood. The mate of the sitting bird was usually found roosting in the branches of the same tree, or one near by. The clutch consisted of two eggs—in one instance only were three young birds found in a hollow. These were at different stages of growth. The youngest seemed to be about four days old, the next six, and the oldest about eight. The oldest one had a few feathers showing; eyes widely open; bill black, cere yellowish-green; legs and feet greenish-white. The smallest was covered with white down and had its eyes only slightly open. The bottom of this hollow was covered with the remains of Fruit-Pigeons. One hollow found in possession of a pair of Owls had evidently been the subject of a dispute, as it contained a broken egg of the Owl and a broken eggshell of a Little White Cockatoo. Mr. M'Lennan had previously seen the Little

White Cockatoos about the hollow, but the Owls were the ultimate possessors. That they were able to dispossess more formidable antagonists was shown in one case where their eggs were found in the freshly-lined hollow of *Microglossus aterrimus.* On two occasions Little White Cockatoos had their nesting hollow in the same tree as a pair of Owls. The soft parts of this Owl are as follows : cere greenish, bill horn colour, feet yellow."

In the *Austr. Mus. Spec. Cat.*, No. 1, Vol. III., p. 308, Mr. M'Lennan's notes as to the egg-laying and nesting of the Cape York bird are given in more detail, and from that place I quote Mr. Keartland's note : "The Western Winking Owl (*Ninox occidentalis*) is usually seen in pairs in the bushes or thick scrub on the margin of the rivers and streams of North-western Australia. Although nocturnal birds, they appear to see well in the brightest sunlight. I shot one of a pair near the Fitzroy River, and had to chase its mate from tree to tree for some time before securing it. It appeared to see me quite well enough to make its escape before I got within shooting distance, and was only secured by strategy. They feed on small animals, birds, lizards, insects, and frogs. I never heard them utter a note of any kind."

The species *connivens* was recognised from Australia until 1875, when Salvadori distinguished the Cape York form as a distinct species under the name *Ninox peninsularis,* though obviously this was only a smaller and darker race. It was at once recognised by Sharpe when he received a specimen collected by the "Alert" Expedition. It was justly regarded as a subspecies only by Ramsay in 1888, of the same status as his own race *Ninox connivens—occidentalis,* which he had described two years before from Derby, North-west Australia. While these three are more or less easily recognisable, the birds occupying the intervening country, Northern Territory and North Queensland, are so variable and show such intermediate characters that Hartert called them *occidentalis,* Sharpe named them *peninsularis,* and North determined them to be true *connivens.* I proposed to call them *suboccidentalis* and treat them as a distinct race, and so scientifically settle the matter. In my *List of the Birds of Australia* I conservatively rejected the last-named race, using the name *occidentalis* to cover all the North-western and Northern Territory birds, but after due consideration I here would maintain my earlier conclusion as being the better plan.

This will allow the admission of five subspecies and will display the facts better than any other arrangement. As above noted, the species was described from the Watling Drawings, which were made at Sydney, and consequently the type locality is New South Wales. Hence :

Hieracoglaux connivens connivens Latham.
New South Wales.

The range of the typical form is New South Wales, South Queensland, and Victoria; it is unknown in Tasmania and I have no record from South Australia. Although North includes the latter, he probably only intended the Northern Territory.

Hieracoglaux connivens addenda Mathews.

South-west Australia.

I separated this form on account of its larger size, being the only course possible consistent with accuracy. The specimen could not be associated with true *connivens*, as it was larger and slightly darker and was disconnected geographically by South Australia a distance of some hundreds of miles. The nearest geographical race is *occidentalis*, and many specimens of this from the type locality differed very obviously. It is desirable that more specimens should be secured from this locality, but in the meanwhile a name is necessary to record the facts.

Hieracoglaux connivens occidentalis Ramsay.

North-west Australia.

In 1886 Ramsay described two specimens from Derby, North-west Australia, as follows: "Two specimens alike in plumage show a larger amount of white on the upper wing-coverts, scapulars and hind neck, than in the N.S. Wales or Cape York specimens. The whitish bands on the tail do not reach the shaft of the feathers; all the under-surface of the body white, with a distinct well-defined band of rufous-brown down the centre of each feather; the outer webs of the primaries, near the adjacent tips of the secondaries, have also a faint reddish tint; the face is almost white; length 15 inches, wing 12 inches, tail 6.8 inches, tarsus about 1.4 inch; the feet small, claws comparatively weak. I believe this will prove to be a distinct species, but must be compared with some of its New Guinea allies. For the present, I place it as a western variety of *N. connivens*, which may be distinguished as *occidentalis*."

Two years later Ramsay wrote: "*Ninox connivens occidentalis* Ramsay must be considered as a distinct race; the Western birds can always be distinguished from the Eastern form."

North in 1898 added: "Specimens since obtained in the same locality prove it to be a distinct species," and treated it as such in the *Austr. Mus. Spec. Cat.*, No. 1, Vol. III., p. 309, 1912.

Campbell regarded it as a subspecies only, which is its correct rank.

Hieracoglaux connivens suboccidentalis Mathews.

Northern Territory.

When I drew up my "Reference List" I separated this form, writing: "Differs from *N. c. connivens* in its paler coloration, but not so pale as

N. c. occidentalis, which it most resembles." In my List I lumped this form with the latter, but here admit it. The facts are that from the range of typical *occidentalis* to the range of typical *connivens,* all across the Northern Territory, birds are secured which are more or less variable, sometimes approximating to the one, sometimes to the other. A more complex nomenclature would be:

Hieracoglaux connivens connivens—occidentalis,

and as the range of country is very great I do not advise this course. It is more than possible that when longer series of birds are available, two or three distinct races may be determined in the country named for this form.

In the *Nov. Zool.*, Vol. XII., 1905, p. 209, Hartert recorded specimens from the West Kimberley District, South Alligator and Mary Rivers, Northern Territory, under the name *Ninox connivens occidentalis,* writing: "The western form is smaller, above paler, the stripes on the under-side always much more rusty than in *N. c. connivens,* though the latter vary, being sometimes lighter, sometimes darker."

North regarded such specimens as typical *connivens,* though he noted Hartert's conclusions under the "species" *occidentalis.* Thus he wrote: "I have also examined specimens from different parts of Western Australia, Victoria, Queensland, and as far north and west as Port Keats, in the Northern Territory of South Australia, and not far from the border-line of North-western Australia. From this locality I expected to find *Ninox occidentalis* or an intermediate form, instead of a typical *N. connivens,* and similar to examples obtained in New South Wales. An adult male obtained at Cooktown, Queensland, is slightly paler, and has a more pronounced white face than southern examples." The type of *suboccidentalis* came from Port Keats, and my specimens resembled *occidentalis,* which indicates variation. As recorded above by Macgillivray, I recognised Cloncurry, Queensland, specimens as referable to this form, while North determined them as true *connivens.* Macgillivray himself does not pass any opinion, but he states that *peninsularis* is quite distinct from these Cloncurry birds. I note this, as when Sharpe received a specimen of typical *peninsularis* he reviewed the species again and observed: "The British Museum contains a good series of this apparently well-marked species, which differs from *Ninox connivens* by the rufous streaks on the lower parts." I find that he recognised all the Northern Territory and North-western birds under this name as the birds in the British Museum are so labelled. Thus two specimens labelled *Ninox peninsularis* bear Elsey's label with the data: "Athene. Male. Stomach empty. Osfurc. feeble. Aug. 18, 1856. Long. 137°, Wentworth River," and "*Strix.* No. 14, p. 19. Male. Gizzard contained only insects' tarsi, mandibula, etc. Vict. River. Nov. 55."

Such diversity of opinion necessitates the usage of a distinct name for this varying and puzzling form. I write puzzling, but this is probably only due to want of specimens.

Hieracoglaux connivens peninsularis Salvadori.
Cape York.

This subspecies was described by Salvadori on account of its smaller size and darker colour, and was accepted by Sharpe, as noted above, for all Northern birds. The researches of M'Lennan, Barnard and Kemp have made this form familiar and North accepted it, but did not consider it as distinct as the Western form, while Macgillivray concluded it was quite distinct. It is certainly recognisable as a well-defined subspecies, but no higher value can be placed upon it.

It is represented in New Guinea and the islands by two or more forms; there is not material available to determine how many, but specialists on New Guinea, etc., birds admit two.

Rothschild and Hartert (*Nov. Zool.*, Vol. XIV., 1907) dealing with Papuan Owls admit:

p. 444. *Ninox connivens connivens* Latham; Australia (East).

p. 445. *N. c. occidentalis* Ramsay, Western form, observing: "Probably *Ninox peninsularis* Salvad. from Cape York is a closely allied form of this species."

p. 445. *N. c. assimilis* Salvad. & D'Alb.: "Very much smaller than the Australian allies."

p. 445. *N. c. rufostrigata* Gray: "Quite like *N. c. assimilis*, but much larger."

Apparently Rothschild and Hartert were unaware of Sharpe's determination of *Ninox peninsularis* Salvadori when he reported upon the "Alert" Collection, *nor did they examine* the British Museum collection, where many birds are labelled *Ninox peninsularis*, including reputed Cape York specimens. It would be concluded that monographic reviews such as Rothschild and Hartert have furnished in these "Notes on Papuan Birds" would consider the majority of available material, but from the preceding it will be gathered they have not done so. The first specimen of *N. assimilis* (from the Astrolabe Range, and probably therefore correctly determined) I measured in the British Museum had the wing over 270 mm., which is therefore *not* "very much smaller than the Australian allies."

In the Jubilee Suppl., No. 2, of the *Ibis*, Dec., 1915, Ogilvie-Grant has emphasized Rothschild and Hartert's error on p. 256. He has written

Ninox rufistrigata assimilis with the comment: "The New Guinea bird is certainly a subspecies of *N. rufistrigata* (Gray) from Gilolo; but I am by no means convinced that it should be regarded as a subspecies of the much larger *N. connivens* Lath. from Eastern Australia."

The Cape York form of *Ninox connivens* was apparently not considered by Ogilvie-Grant, nor was the size of *N. rufistrigata*; Salvadori gave for the former a wing length of 260-275 mm., and I measured a British Museum skin of *assimilis* as over 270 mm. This shows that *N. connivens* at Cape York is not "*much larger*" than *assimilis*. Further, if *assimilis* cannot be regarded as a subspecies of *connivens* on account of the size of the latter, it cannot be regarded as a subspecies of *rufistrigata*, as according to Rothschild and Hartert the latter is "*much larger*." The tail coloration is not of specific value in this case, so that Ogilvie-Grant's contention is untenable. There can be little doubt that both *rufistrigata* and *assimilis* are only subspecies of *connivens* as Rothschild and Hartert placed them, but the birds called *assimilis* are certainly *not* "very much smaller." Further, probably more than one subspecies is confused under the name *assimilis*, and this might account for the statements made.

Hieracoglaux connivens assimilis (Salvadori and D'Albertis).
Southern New Guinea.
Hieracoglaux connivens rufostrigatus (Gray).
Gilolo, Morty, Batjan, etc. (Rothschild and Hartert).

GENUS—RHABDOGLAUX.

RHABDOGLAUX Bonaparte, Rev. Mag. de Zool. 1854, p. 543.. Type *R. rufa.*
Also spelt—
Rabdoglaux and *Rhodoglaux* Gray, Cat. Gen. Subgen. Birds, p. 135, 1855.

VERY large Strigine birds with long powerful bills, long wings, long tails, and short powerful legs and short strong toes.

The bill is long, powerful as in the succeeding genus, but more rapidly curving as in *Hieracoglaux*; the nostrils are oval, obscured by very long bristles, and are scarcely visible from the frontal view.

The wing is long, with the wing formula of *Hieracoglaux* and *Spiloglaux*, from which genera the bird differs altogether in coloration.

The tail is long and straight and proportionately a little longer than in those genera.

The legs are very short and powerful and fully feathered; the toes are strong but comparatively short, not much exceeding those of *Hieracoglaux*, though the present bird is so much larger.

This distinct genus stands alone by means of its coloration and size, while its peculiar feet at once separate it from the other genera. The facial disc is practically missing, and the hawk-like bill is very prominent.

From field observations it appears that this and the preceding genera are day-hunters almost as much as night-feeders.

No. 318.

RHABDOGLAUX RUFA.

RUFOUS OWL.

(Plates 265 and 266.)*

Athene rufa Gould, Proc. Zool. Soc. (Lond.) 1846, p. 18: Port Essington, Northern Territory.

Athene rufa Gould, Proc. Zool. Soc. (Lond.) 1846, p. 18; *id.*, Birds Austr., Vol. I., pl. 36, 1848; Bonaparte, Consp. Gen. Av., Vol. I., p. 43, 1850.

Ieraglaux rufus Kaup, Contr. Orn. (Jardine) 1852, p. 109.

Rhabdoglaux rufus Bonaparte, Rev. Mag. de Zool. 1854, p. 543.

Hieracoglaux rufus Gould, Handb. Birds Austr., Vol. I., p. 69, 1865.

Ninox rufa Ramsay, Tab. List Austr. Birds, p. 2, 1888; *id.*, Cat. Austr., Striges, p. 24, 1890; De Vis, Ann. Rep. Brit. New Guin., App. EE, p. 99, 1894 (N.Q.); North, Austr. Mus. Cat., no. 4, p. 26, 1898; Hall, Key Birds Austr., p. 6, 1899; Mathews, Handl. Birds Austral., p. 44, 1908; Broadbent, Emu, Vol. X., p. 233, 1910 (N.Q.); Hill, *ib.*, p. 268, 1911 (N.-W.A.); H. L. White, *ib.*, Vol. XV., p. 60, 1915.

Ninox humeralis (not of Bonaparte) North, Austr. Mus., no. 4, p. 27, 1898; Hall, Key Birds Austr., p. 6, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 49, 1901; Mathews, Handl. Birds Austral., p. 44, 1908; H. L. White, Emu, Vol. XV., p. 60, 1915.

Ninox rufa rufa Hartert, Nov. Zool., Vol. XII., p. 210, 1905 (N.T.); Mathews, *ib.*, Vol. XVIII., p. 256, 1912.

Ninox humeralis queenslandica Mathews, Bull. Brit. Orn. Club, Vol. XXVII., p. 62, March 3, 1911: Mackay, North Queensland.

Ninox rufa queenslandica Mathews, Nov. Zool., Vol. XVIII., p. 256, 1912.

Rhabdoglaux rufa Mathews, List Birds Austr., p. 116, 1913.

Rhabdoglaux queenslandica Mathews, *ib.*

Distribution. North-west Australia; Northern Territory; North Queensland.

Adult female. General colour above pale brown with narrow cross-bars, which vary in colour from smoke-grey at the tips of the feathers to white towards the bases; lesser upper wing-coverts somewhat darker than the back; bastard-wing and primary-coverts blackish, barred with brown; primary- and secondary-quills

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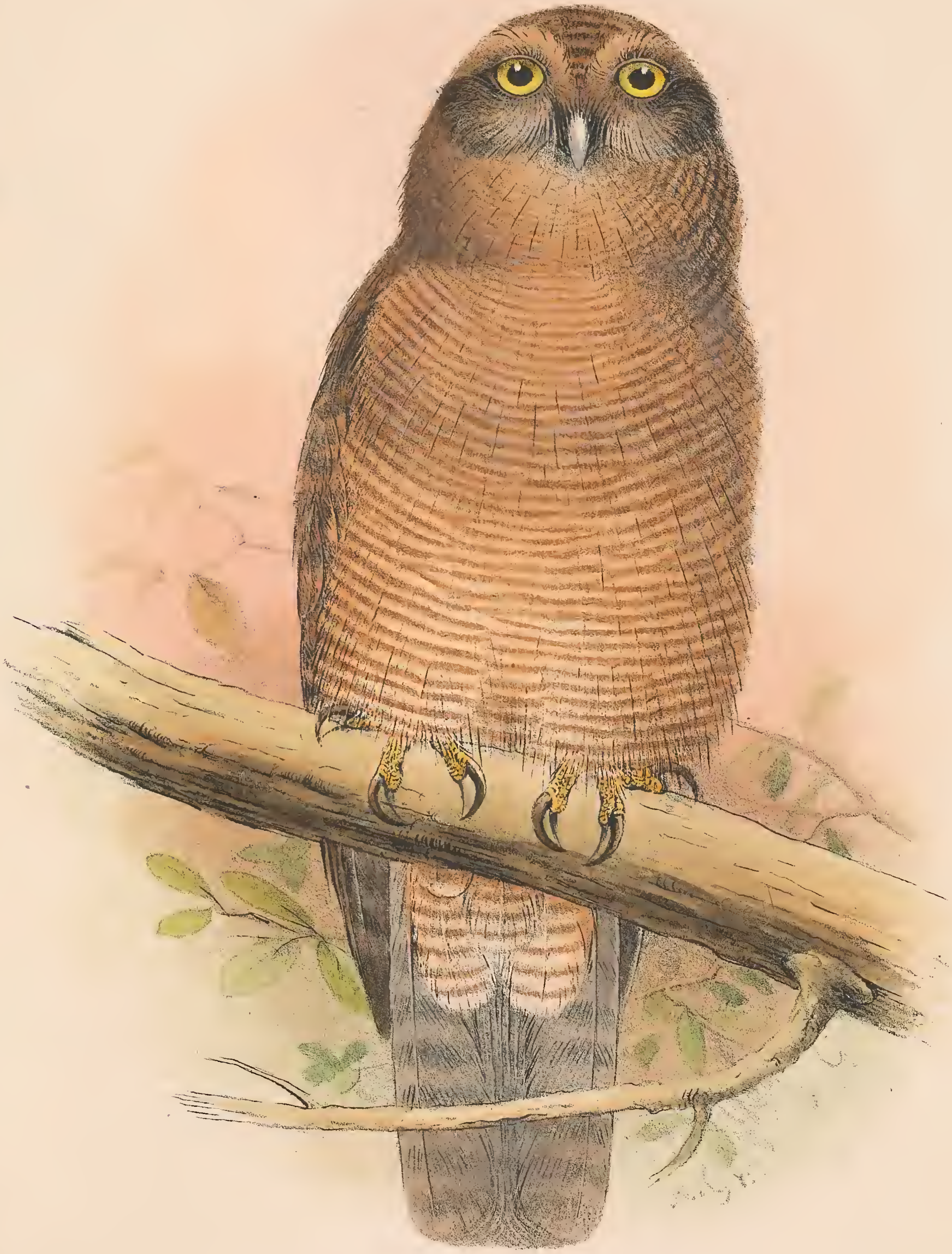
* The Plates are lettered *Rhabdoglaux rufa* and *Rhabdoglaux queenslandica*.



H. Grönvold del.

Witherby & Co

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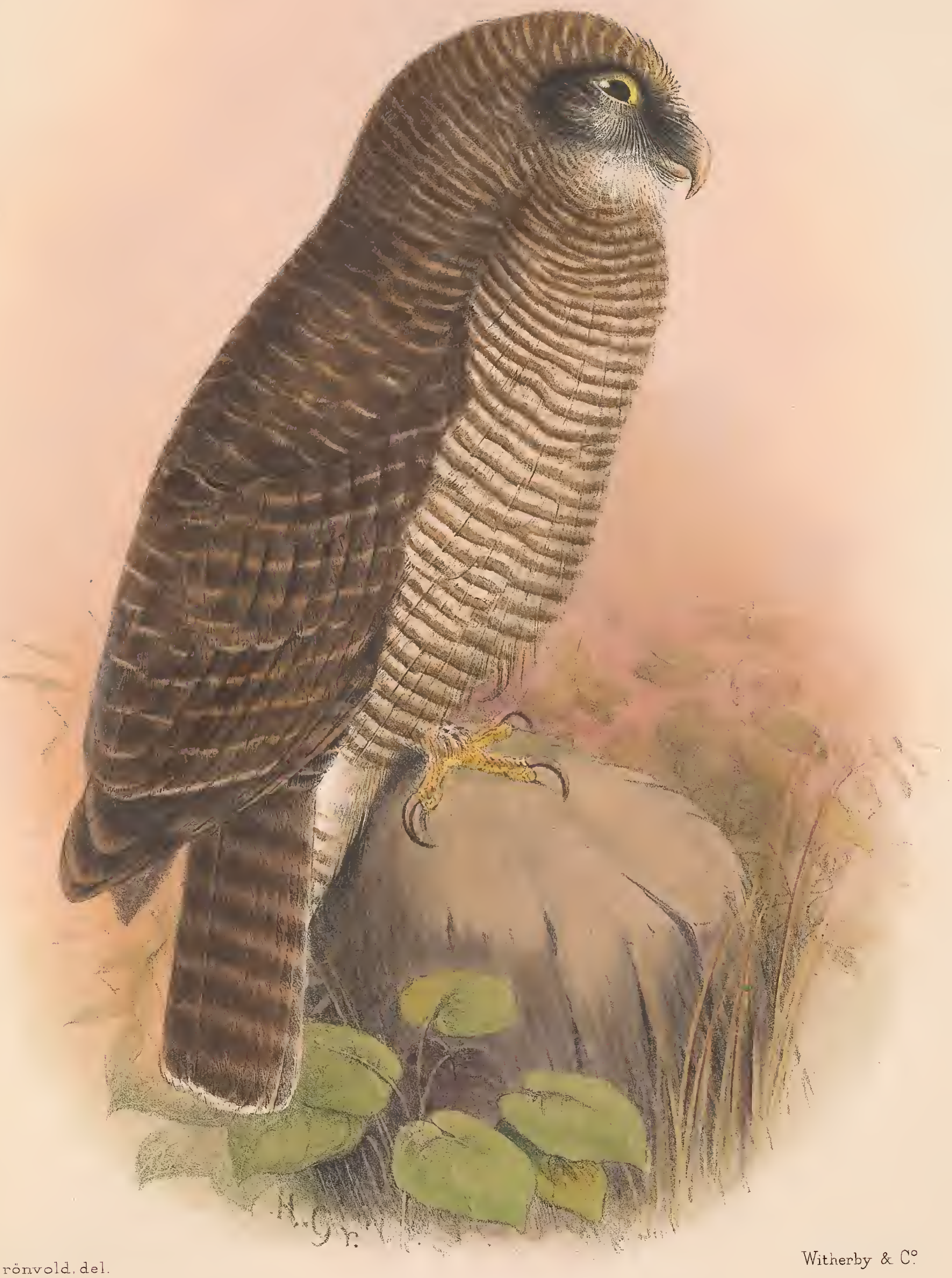
RHABDOGLAUX RUFA.

(RUFOUS OWL).



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Witherby & C°.

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RHABDOGLAUX QUEENSLANDICA.

(*BANDED OWL*).

brown, broadly barred and tipped with pale smoke-brown, the bars widening out and inclining to buff on the inner webs towards the base; tail similar, but the bars rather narrower; crown of head similar in colour to the back, but the bars narrower, the feathers on the fore-head white at the base; the bristly feathers at the base of the upper mandible white at the base and black at the tip, like those on the cheeks, those surrounding the eye black; throat and entire under-surface bright tawny-rufous narrowly barred with buffy-white; thighs and tarsi sandy-buff; toes sparsely covered with hair-like feathers which are whitish in colour. Bill bluish-grey; eyes yellow; feet light yellow. Total length 550 mm.; culmen 30, wing 344, tail 220, tarsus 47. Figured. Collected at Admiralty Gulf, North-west Australia, on the 14th of November, 1911.

Adult male. Similar to the adult female from the same locality.

Adult male. General colour above brown, including the head, back, wings and tail, with narrow smoky, or white, bars which are wider on the primary- and secondary-quills and tail-feathers; edge of wing more or less white; bastard-wing and primary-coverts darker and more uniform than the back; edge of wing for the greater part white; primary- and secondary-quills brown, broadly barred with smoky-brown, which widens out on the inner webs and becomes more or less white; tail-feathers very similar to the flight-quills in colour and edged with whitish at the tips; base of fore-head, fore part of cheeks and throat white at the base, with black hair-like tips to the feathers; ear-coverts and feathers surrounding the eye black in colour and bristly in texture like those at the base of the bill; under-surface brown but somewhat paler than the upper-surface, the white bars on the throat, fore-neck and under wing-coverts narrow, becoming wider and more pure white on the breast, abdomen and under tail-coverts; the feathers on the vent and lower flanks fluffy and almost uniform white; thighs and tarsi buff with black tips to the feathers on the front aspect; hinder aspect uniform buff or creamy-white, toes sparsely covered with hair-like feathers. Bill horn, base blue; eyes yellow; feet yellowish. Total length 520 mm.; culmen 30, wing 347, tail 220, tarsus 50. Figured. Collected at Mackay, North Queensland, and is the type of *Rhabdoglaux humeralis queenslandica* (Mathews).

Immature. Resembles the adult female from North-west Australia.

Nest. A hollow in a tree.

Eggs. Clutch, two or three, white and roundish, 53 mm. × 45. mm.

NOTHING whatever appears to be known concerning the habits of this bird, but quite a literature has grown round it through its rarity and consequent unfamiliarity. Gould received a specimen from Gilbert procured at Port Essington and described it as follows:

"Facial disc dark brown; all the upper-surface dark brown, crossed by numerous narrow bars of reddish-brown, the tints becoming paler and the barrings larger and more distinct on the lower part of the body, wings and tail; all the under-surface sandy-red, crossed by numerous bars of reddish-brown, the feathers of the throat with a line of brown down the centre; vent, legs and thighs of a paler tint, with the bars more numerous but not so decided; bill horn colour; toes yellowish, slightly clothed with feathers. Total length 20 inches; bill 1.75, wing 13.5, tail 9.5, tarsi 2.25.

"*Habitat.* Port Essington.

"*Remark.* Very powerful, nearly allied to *Athene strenua.*"

A good plate was given in the *Birds of Australia*, but the last remark appears to have misled workers.

When Sharpe drew up his *Catalogue of the Birds in the British Museum*, Vol. II., 1875, he placed the name as a synonym of *strenua*, which proves conclusively that he neither read Gould's description nor referred to his plate. It has been assumed that Sharpe concluded that *rufa* must be the young of *strenua*, but this assumption is impossible, as Sharpe carefully described and catalogued the immature of *strenua*, which gave no colouring at all resembling the description of *rufa*. Moreover, Sharpe had skins at that time practically agreeing with that description, so that his action is incomprehensible and can only have been due to a very bad oversight. It, however, caused confusion, and Sharpe himself never rectified his mistake, which was continued in the "Handlist" Birds.

De Vis appears to have been the first to detect Sharpe's error, as when recording birds from New Guinea in the *Ann. Rep. Brit. New Guinea*, App. EE, p. 99, 1894, he observed under the name *Ninox humeralis* Hombr. and Jacq.: "This owl is identical with one of the large owls of the mountain scrubs of the Cardwell district of Queensland, *N. rufa* Gld., at one time supposed to be the young of *N. strenua* Gld. The present example is unusually small (wing 320 mm.) and is rather paler on the abdomen than Queensland birds. One may regard the latter as an isolated race, whether in its original seat or not."

This note attracted the attention of North, who in the *Austr. Mus. Cat.*, No. 4, p. 28, 1898, catalogued *Ninox humeralis* with the remarks: "It was in an Appendix to the 'Annual Report on British New Guinea for 1894' that Mr. De Vis, the Curator of the Queensland Museum, first drew attention to the existence of this species in Australia, and he there states his belief that it is identical with *Ninox rufa* of Gould. Mr. De Vis has kindly sent me for examination a specimen obtained in the scrubs of north-eastern Queensland. It is a male and is labelled 'Herbert Gorge, October 1886.' This specimen cannot be distinguished from typical examples of *N. humeralis* obtained in New Guinea. In all the specimens examined belonging to this species, the ear-coverts are black and the tail-feathers crossed with eight pale brown bars."

On p. 26 he had catalogued *Ninox rufa*, with a long note of explanation on p. 27: "Mr. G. R. Gray in his 'Hand-List of Birds' places Gould's name of *N. rufa* as a synonym of *N. strenua*, in which he is followed by Dr. Sharpe in the *Catalogue of the Birds in the British Museum. N. rufa* is, however, a good and distinct species. Closely allied, if not identical with it, is

N. humeralis, of Hombron and Jacquinot. Judging by a single specimen in the collection from North Australia, where the type of *N. rufa* was obtained by Gilbert, it may be distinguished from *N. humeralis* by its paler and more numerously barred upper-surface, its ear-coverts being brown indistinctly streaked with white, instead of entirely black; the barrings on the breast sandy-rufous and without any conterminous lines of dark brown, and the tail-feathers being crossed with thirteen pale brown bars, instead of eight as in *N. humeralis*. Total length 19.25 inches; wing 14.5, tail 9.75, bill 1.95, tarsus 2. Gould's figure, which is not a good one of *N. rufa*, however, exhibits the same number of cross-bars on the exposed portion of the under-surface of the tail-feathers as are found in *N. humeralis*, and the wing-measurement in the description is almost the same as that given by Dr. Sharpe of the latter species. Should subsequent research prove these two birds alike, which I have here kept distinct, Hombron and Jacquinot's name of *N. humeralis* must rank as a synonym of Gould's older name of *N. rufa*."

Seven years later Hartert recorded specimens from the South Alligator River, Northern Territory, under the name *Ninox rufa rufa*, commenting: "Gould's *Ninox rufa* has evidently been erroneously united with *N. strenua* in the *Cat. B.* II., and, unfortunately, the error is repeated in the Hand-List, Vol. I. I have before me a series of adult *strenua* and of equally adult *rufa*. *Ninox rufa rufa* inhabits N.W. Australia. Specimens from the Cape York Peninsula and North Queensland seem to be smaller and should probably be separable subspecifically. I have, however, only seen two, and I hesitate to name this form from such a small material. These Cape York specimens have apparently been identified with *Ninox rufa humeralis* from New Guinea, but the latter is darker and still smaller than the North Queensland examples, which agree in colour with Western *rufa*."

It will be observed that no mention is made of either the observations of De Vis or the criticism of North, so that probably Hartert was ignorant of the writings of these Australian workers.

Upon receipt of specimens showing plumage changes, I differentiated the Queensland form under the name *Ninox humeralis queenslandica*, writing: "Differs from typical *N. humeralis* (Homb. and Jacq.) from New Guinea, in having the light-coloured bars on the under-surface white, and the brown ones with a very slight tinge of buff. All the bars on the under-surface are wider than in *N. humeralis*.

"*Hab.* The Hollows, Mackay, North Q'ld.

"*Obs.* Immature birds shot in Queensland are hardly to be distinguished from immature examples of *Ninox humeralis* shot in New Guinea, but in the fully adult plumage they are very distinct."

In my "List" I maintained the Northern Territory birds as a distinct species from the Queensland ones, but here I consider them conspecific. They are similar in size and markings but not in coloration, although the immature of the Queensland and New Guinea birds agree with specimens from the Northern Territory in the narrow bars on the under-surface and light coloration. The mature of the Queensland form shows a darker upper-surface and the bars of the under-surface darker and wider. New Guinea birds have been examined showing the change, and it may be that Northern Territory birds will come to hand proving the same plumage change. At the present time there can be no doubt that *N. humeralis* and *queenslandica* are only subspecifically separable, and the differences observed between these and *rufa* seem only due to age. The matter of size between the Northern Territory and Queensland birds, mentioned by Hartert, does not appear to be confirmed, whereas the New Guinea birds are less, as De Vis observed but did not emphasize: the paler coloration he mentioned is undoubtedly due to age. There seems to be doubt that this pale coloration is carried for some time, as a number of birds are met with in this stage, and that it may be some years before the dark plumage is attained. I have described and figured the Northern Territory and Queensland birds, which I now rank as subspecies, but I have never seen a specimen from either North-west Australia or Northern Territory as dark as the Queensland bird figured.

Three subspecies may be recognised:

Rhabdoglaux rufa rufa (Gould).

Northern Territory, North-west Australia.

Rhabdoglaux rufa queenslandica (Mathews).

North Queensland.

This would appear to be a darker race, but there does not seem to be any appreciable difference in size.

Rhabdoglaux rufa humeralis (Bonaparte).

New Guinea.

This race may be slightly less and perhaps paler. Hartert, as quoted previously, considered it to be darker, and when Rothschild and Hartert wrote on Papuan Owls they did not further discuss it.

GENUS—BERNEYORNIS.

BERNEYORNIS Mathews, *ante*, p. 305 .. .. .. Type *B. strenuus.*

LARGEST Strigine birds, with very powerful bills, long wings, long tails, very short powerful legs, and very strong long toes.

This overlooked generic form is as distinct as any yet characterized in the Australian Avifauna. The bill is quite distinctive, recalling that of a Kite in appearance, being long, and the culmen more straight than in other forms. I classed it, as others had done, with *Hieracoglaux,* so comparisons may be made with that genus. Generally speaking, the measurements are half as long again, which means that the bird looks about three times the bulk. The bill is of a different shape and the nostrils are scarcely seen at all from the frontal view, nor are they much obscured at a side view.

The wing is long and has a distinct formula: the first is more than half the length of the third but shorter than the eighth, while the second is shorter than the third and seventh; the third, fourth, fifth and sixth are longest and subequal. The outer web of first primary is more strongly serrated (or stiff) than in any other Australian form.

The tail is long and straight, being proportionately longer than in the preceding genus.

The tarsus is fully feathered and is very stout and short, being proportionately much shorter than in *Hieracoglaux*; the toes are very powerful, and the middle toe is as long as the tarsus, while the claws are very strong and long.

The large size of this Owl, combined with its distinct coloration, its different wing-formula and its very short but powerful legs and very stout feet, make it the most striking member of the Australian Strigiformes. The other large Owl, *Rhabdoglaux,* is inferior in many respects, but both agree in lacking a very noticeable facial disc.

It is remarkable that this form has not been characterized before, and an examination of the internal features is much desired, when it is probable many surprising features will be observed.

No. 319.

BERNEYORNIS STRENUUS.

POWERFUL OWL.

(Plate 267.)*

Athene (?) strenua Gould, Synops. Birds Austr., pt. iii., pl. (49), Apl. 1838; New South Wales.

Athene (?) *strenua* Gould, Synops. Birds Austr., pt. iii., pl. (49), 1838; *id.*, Proc. Zool. Soc. (Lond.) 1837, p. 142, Dec. 1838; *id.*, Birds Austr., Vol. I., pl. 35, 1848; Bonaparte, Consp. Gen. Av., Vol. I., p. 43, 1850; Diggles, Orn. Austr., pt. xix., 1868; Witmer Stone, Austral Av. Rec., Vol. I., p. 147, 1913.

Surnia strenua Selby, Cat. Gen. Subgen., Types Aves, p. 4, 1840.

Jeraglaux strenua Kaup, Archiv. fur Naturg. 1851, p. 104.

Ieraglaux strenua Kaup, Contr. Ornith. (Jardine) 1852, p. 109.

Ieroglaux strenua Bonaparte, Revue Mag. Zool. 1854, p. 543.

Noctua strenua Schlegel, Mus. de Pays-Bas, Vol. II., Striges, p. 40, 1862.

Hieracoglaux strenuus Gould, Handb. Birds Austr., Vol. I., p. 68, 1865.

Ninox strenua Sharpe, Ibis 1875, p. 258; *id.*, Cat. Birds Brit. Mus., Vol. II., p. 178, 1875; Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 178, 1878; Broadbent, Proc. Roy. Soc. Queensland, Vol. II., p. 119, 1886; Ramsay, Tab. List Austr. Birds, p. 2, 1888; *id.*, Cat. Austr., Striges, p. 22, 1890; North, Austr. Mus. Cat., no. 4, p. 24, 1898; Hall, Key Birds Austr., p. 6, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 48, 1901; Barnard, Emu, Vol. VII., p. 187, 1908 (Q.); Mathews, Handl. Birds Austral., p. 44, 1908; Barnard, Emu, Vol. IX., p. 30, 1909 (Q.); Mathews, Nov. Zool., Vol. XVIII., p. 256, 1912; H. L. White, Emu, Vol. XII., p. 21, 1912 (Q.); *id.*, *ib.*, Vol. XV., p. 60, 1915.

Ninox strenua victoriæ Mathews, Austral Av. Rec., Vol. I., p. 75, June 28, 1912; Victoria.

Ninox strenua strenua Mathews, *ib.*

Hieracoglaux strenua Mathews, List Birds Austr., p. 115, 1912.

Distribution. Queensland; New South Wales; Victoria.

Adult. General colour above dark brown barred with white and pale smoke-brown; primary-coverts uniform dark brown edged with smoky-brown at the tips; primary- and secondary-quills dark brown barred with smoke-brown which broaden out and become white on the inner webs; tail-feathers also dark brown barred

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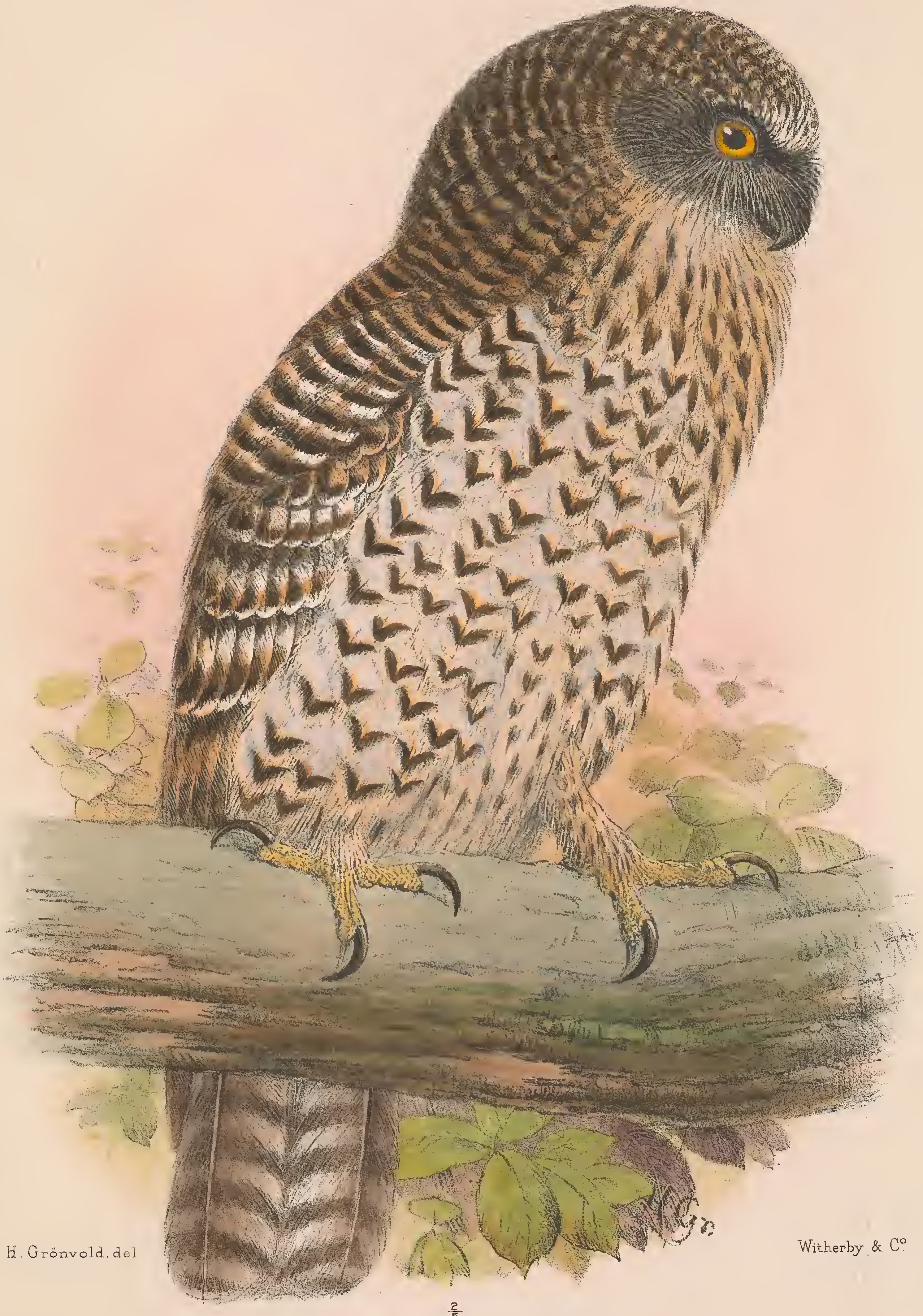
* The Plate is lettered *Hieracoglaux strenua.*



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HIERACOGLAUX STRENUA.

(POWERFUL OWL)

with white, which have a smoky tinge; the feathers round the eye and those surrounding the base of the bill disintegrated and bristly in texture, white webs at the base and black hair-like shafts; throat and under-surface white, or buffy-white barred with brown, the brown bars being sometimes edged with buff, the white portion of the feathers is very wide on the sides of the body and narrow on the thighs; the toes are covered with hair-like feathers. Bill black; base of culmen and sides of lower mandible horn; eyes yellow; feet grey. Total length 650 mm.; culmen 31, wing 405, tail 260, tarsus 54. Figured. Collected in Victoria and is the type of *Berneyornis strenuus victoriæ* (Mathews).

Nestling. "Head, neck and under-surface of body pure white, all the feathers fluffy, apparently the remains of nestling-plumage; on the crown some brown feathers barred across with white; the fore-head streaked with brown, the lores obscured by blackish bristles, as also the eyebrows and cheeks; ear-coverts dark brown, streaked with white; the under-surface with a few narrow shaft-streaks of dark brown, broader on the flanks and sides of the body, the plumes on the sides of the upper-breast barred with brown; the back and all the rest of the upper-surface ashy-brown, transversely barred with white, some of the bars washed with rufous; quills dark brown tipped with white and crossed besides by fine narrower whitish bars" (Sharpe, *Cat. Birds B.M.*, Vol. II., p. 179, 1875). This is a good description of the specimen in the British Museum, which I have examined and which is a three-quarters grown bird not out of the nest.

Nest. "In a spout of a tree growing in dense scrub" (H. L. White).

Eggs. "The eggs are of typical *Ninox* shape, being almost round; the shell is pure white, close grained and glossy, with a few limy excrescences scattered over the surface; one specimen has a number of shallow longitudinal grooves or creases running the whole length of the shell. Measurements in inches: (*a*) 2.29 × 1.94, (*b*) 2.23 × 1.9, (*c*) 2.15 × 1.91" (H. L. White).

Breeding-season. "November" (H. L. White).

THE life-history of this magnificent Owl appears to be almost unknown. I have no notes from any of my correspondents and I only have one quotation from the pages of the *Emu*. Moreover, this bird is not included in the *Austr. Mus. Spec. Cat.*, No. 1, at all, and I quote the comment of Mr. H. L. White on this matter (*Emu*, Vol. XV., p. 60, 1915):

"This bird is one of Mr. North's most extraordinary omissions. The bird is distinct, well known, and the eggs were described in the *Emu* (Vol. XII., p. 21). In several instances Mr. North has described subspecies without mentioning their eggs; here we have a most distinct species, whose eggs are known, entirely overlooked."

Gould's account is therefore here transcribed, and it is worthy of reproduction, as Gould was the describer of this splendid bird. He wrote: "With the exception of the Eagles, *Aquila audax* and *Polioaëtus leucogaster*, this is the most powerful Raptorial bird yet discovered in Australia. Its strength is prodigious, and woe to him who ventures to approach it when wounded. So far as I have been able to ascertain, it is an inhabitant of the brushes, particularly those of Victoria and New South Wales, which extend along the coast from Port Philip to Moreton Bay. I did, however, obtain it on the precipitous sides of the cedar brushes of the Liverpool range; in all such situations the silence of night is frequently broken by its hoarse loud mournful note, which more resembles the bleating of an ox than any other sound I can compare it to. During the day it reposes under the canopy of the thickest trees, from which, however, it is readily roused, when it glides down the gulleys with remarkable swiftness: the manner in which so large a bird threads the trees while flying with such velocity is indeed truly astonishing. Its food consists of birds and quadrupeds, of which the brushes furnish a plentiful supply. In the stomach of one I dissected in the Liverpool range were the remains of a bird and numerous green seed-like berries, resembling small peas; whether the latter had formed the contents of the stomach of a bird or quadruped which the Owl had devoured, or had been eaten by the Owl itself, I could not satisfactorily ascertain. The bill of this species stands out from the face very prominently; it has also a smaller head and more diminutive eyes than the *Hieracoglaux connivens*, although it is a much larger bird."

Broadbent, writing on the birds of the Chinchilla district, Queensland, stated: "There were a pair of these large owls which frequented the neighbourhood of my camp, especially when the nights were darkest. They uttered a cry of *morepork*, but the sound was deeper and more voluminous than that used by the Boobook owl. The male bird when shot had an opossum, of which the head had been eaten off, in its claws."

C. A. Barnard in the *Emu*, Vol. VII., p. 187, 1908, wrote: "When walking along the edge of a scrub some months ago, about mid-day, a Winking Owl (*Ninox connivens*) flapped out of the branches of a scrub oak just over my head and dropped a half-eaten *Podargus* almost at my feet. I have frequently noticed this habit of the Owls of keeping their night-killed prey with them in their daytime roosting-places. Flying squirrels seem to be their favourite meal, but I have flushed them, at various times in the day, carrying half-eaten ring-tailed opossums, and once a flying fox: the latter, by the way, was the capture of a Powerful Owl (*N. strenua*)."

Campbell writes: "The last Powerful Owl I had an opportunity of examining in the flesh was shot by Mr. A. W. Milligan at one of our camp-outs near Lilydale. The birds are frequently met with in the ranges thereabouts, and have been known to 'pick off' Lyre Birds roosting at night in the tall white gums. The sudden hideous scream of this great Owl is very alarming, especially when, flying swiftly through the forest, it breaks the midnight silence. Even sturdy bushmen quail, while aboriginals dread it as an evil spirit; but to the naturalist the scream is sweet music, albeit but rude and weird.

"With reference to the two varieties of the Powerful Owl, Mr. Kendall Broadbent, in his most interesting article 'Cardwell Birds,' writes: 'The Great Scrub Owl (*N. strenua*) may also be expected to occur in the Cardwell scrubs, but rarely so. It has been shot by me at Freshwater Creek, near Cairns, and seen commonly in the Brisbane scrub and in Gippsland. The Rufous Owl (*N. rufa*) is essentially a frequenter of mountainous country, being shot by me in the high land at the back of Cardwell. It seems always to occur in dense scrubby gullies, and to live habitually in pairs.'"

As might be anticipated in the case of a rare bird with a restricted range, little synonymy is met with. I separated the Victorian bird but here regard it as inseparable; though these are larger than typical specimens, the difference is not sufficient to require emphasis at the present time. It may be remarked that the known range of the genus and species is as here given: Queensland, New South Wales and Victoria; the additional localities, Northern Territory, Cape York, South Australia, quoted by Ramsay, North and Campbell being due to the confusion between this bird and *Athene* (?) *rufa* Gould, as explained under the latter species.

GENUS—TYTO.

TYTO Billberg, Synops. Faunæ Scand., Vol. I., pars II., tab. A, 1828	Type	*T. alba.*
Ulula Nitzsch, Observ. Av. Art. Carot Comm., p. 20, 1829. (New name for *Strix* auct., ex Savigny. Not *Ulula* Cuvier 1817)	Type	*T. alba.*
Flammea Fournel, Fauna de la Moselle, p. 101, 1836	Type	*T. alba.*
Hybris Nitzsch, Pterylographie, pp. 27-100, 1840 ..	Type	*T. alba.*
Eustrinx Webb and Berthelot, Hist. Ile Canaries, Zool., p. 8, 1841	Type	*T. alba.*
Stridula Selys-Longchamps, Faun. Belg., p. 60, 1842	Type	*T. alba.*
Glaux Blyth, Journ. As. Soc. Bengal, Vol. XIX., p. 513, 1850	Type	*T. longimembris.*
Scelostrix Kaup, Contr. Orn. (Jardine) 1852, p. 119	Type	*T. longimembris.*
Dactylostrix Kaup, Contr. Orn. (Jardine) 1852, p. 119	Type	*T. n. castanops.*
Strix Savigny, Descr. Egypt. Hist. Nat., Vol. I., pp. 69-113, 1809. (Not *Strix* Linné 1758.)		
Aluco Fleming, Philos. Zool., Vol. II., p. 236, 1822. (Not *Aluco* Link 1807.)		
? *Glyphidiura* Reichenbach, Av. Syst. Nat., pl. XCII., 1850.		
Strigymnhemipus, Des Murs. Encycl. d'Hist. Nat. (Chenu) Ois., Vol. I., p. 146, 1854..	Type	*T. a. tuidara.*
Glaucostrix " Bp. 1854 " Gray, Cat. Gen. Subg. Birds, p. 135, 1855.		

THE Barn Owls have been separated from the rest of the Owls with the rank of a Family on account of the difference in the pterylosis of the nestling, which is accompanied by differences in their osteology. Superficially, there are no great visible differences, which prove that osteological characters can differ without revealing themselves superficially.

TYTO.

Medium-sized birds for the Order, they possess the most marked facial discs, projecting bills, long wings, medium tails, long legs and medium feet.

The bill is well hooked, projecting from the face; the cere is obscurely defined; the nostrils appear as ovals, half covered by an operculum, placed high up and well forward in the cere. Bristles almost obscure the nostrils from a side view and the nostrils are absolutely hidden from in front. Otherwise nothing striking is seen in the head, save the very pronounced heart-shaped facial disc.

The wings are long and show a striking feature when compared with all the preceding genera, as the first primary is very long, equal to the third, and only slightly exceeded by the second, which is longest: the rest rapidly decreasing. The hard comb-like serrations on the outer web of the first primary very noticeable.

The tail is square and of medium length, not quite half the length of the wing.

The legs are long and the toes short; the tarsus is covered with short feathers and is little more than half the length of the tail. The toes are short, about half the length of the tarsus, and sparsely covered with short hair-like feathers. The claws are long, rounded, the middle one bearing serrations on the inner edge. The inner toe is about equal to the middle in length, the outer one short.

The above description is drawn up from the type of *Tyto*, and two other species inhabiting Australia are commonly referred to this genus with reason. A fourth has just as commonly been placed in this genus with little reason, as will be hereafter shown.

The species *Tyto novæhollandiæ* was given subgeneric rank by Kaup with the name *Dactylostrix*. It agrees generally in coloration with *Tyto alba*, but is larger in size and the legs and feet stronger, the tarsus proportionately shorter and the toes proportionately longer, both stouter.

That is, though the tail is still less than half the length of the wing, the tarsus is less than half that of the tail, and the toes more than half that of the tarsus. Subgeneric difference is certainly indicated, and it is very probable that osteological examination will demand generic rank.

The species *Tyto longimembris* is about the same size and generally agrees in coloration with *Tyto alba*, but differs mainly in its longer legs. As the short toes are still maintained, the tarsus is much more than half the length of the tail, almost two-thirds, while the toes are noticeably less than half the length of the tarsus. Here subgeneric rank is suggested, and here again osteological investigation may require a higher grouping. The name to be used is *Scelostrix*, introduced by Kaup, but he had been anticipated by Blyth with *Glaux* in 1850; a prior *Glaux* has been rejected as a *nomen nudum*, but this rejection is not yet absolutely final, and in the *Mag. Nat. Hist.*, Vol. IX., April 1836, Rylands correctly proposed *Glaux* for the Snowy Owl.

I consider it important that in this place as full a record as possible should be given of the nomenclatural problems surrounding Australian bird names and their solution. Hence it seems necessary to reproduce a lot of old matter, so that the exact working that has brought about the present name should be displayed.

Perhaps the earliest attempt at determining genera of Owls may be laid down to the credit of Brisson, who recognised two, whereas Linné had united all the Owls under one genus *Strix*. Brisson utilised *Strix* for the Tawny Owl and provided *Asio* for the others; whether by chance or intent, Pennant used *Otus* for a third division soon after. Then Dumeril proposed two other generic names, *Bubo* and *Surnia*. None of these concern Australian students in any way, so that we arrive at Savigny. This worker began a monograph on the Natural History of Egypt and dealt with the Hawks and Owls only, upon a magnificent plan. In this case he laid down the genera of Owls with full details, and there restricted *Strix* to the species *Strix flammea* Linné as interpreted by him, which was the Barn Owl. This error was perpetuated for a century, though at different times accurate workers drew attention to it. Thus Fleming in 1822 introduced *Aluco* as a generic term for the Barn Owl, recognising the misusage of *Strix*. Then Billberg in 1828 fully explained the error and proposed *Tyto* for *Strix* as restricted by Savigny. Later Nitzsch, when he investigated the pterylosis of the nestlings and discovered the difference between that of the Barn Owl and other Owls, gave the name of *Hybris* to the former. Newton in 1873 investigated the matter and determined the restriction of *Strix* to the Tawny Owl, and therefore used Fleming's name *Aluco* for the Barn Owl. The prejudice of a great systematist, however, doomed this effort to correction to failure, for Sharpe became, quite wrongly, an antagonist of Newton and maintained *Strix* for the Barn Owl. As Sharpe had the *Catalogue of the Birds in the British Museum* at his disposal he made use of it, and utilising *Strix* in that place practically stifled criticism for many years. However, a generation arose who continued the search for truth without prejudice, and the American Ornithologists rejected *Strix* for the Barn Owl, using *Aluco* even as Newton had done. A few ornithologists on this side, as Rothschild and Hartert, accepted the American usage. In my "Handlist" I accepted Sharpe's names, that list being based entirely on Sharpe's Handlist. I began, however, my criticism of Australian bird names and this case came under consideration. My results appeared in the *Nov. Zool.*, Vol. XVII., Dec. 1910, p. 500, as follows:

"Page 44: Genus CLXXV. *Tyto* Billberg, *Syn. Faunæ Scand.* 1, tab. A (1828) replaces *Strix* (Auctorum, non Linné 1758).

"In the *Amer. O. U. Checklist*, 3rd ed., 1910, *Aluco* Fleming, 1822, is chosen to replace the name *Strix* now generally in use for the Barn Owls. That name, however, is preoccupied by Link, *Besch. Naturl. Samml.*, p. 130 (1807) for a genus of Molluscs. The next name in order appears to be *Tyto* of Billberg, as given above. Billberg, in 1820, had previously proposed *Tyta* for a genus of Insects, so that some may consider the name *Tyto* preoccupied. In that case *Hybris* Nitzsch (*Syst. Pteryl.*, p. 100, 1840) would have a claim."

The sequel appeared in the *Austral Avian Record*, Vol. I., p. 104, Sept. 18, 1912. "In the *Nov. Zool.*, Vol. XVII., p. 500, 1910, I recorded the fact that *Aluco* was invalidated for use in this connection. I accepted *Tyto* Billberg, 1828, noting that *Tyta* had been introduced by the same author eight years earlier, and indicated *Hybris*, 1840, as being apparently next in chronological order should some authors desire to reject *Tyto.* A recent American author accepted the challenge and used *Hybris.* This note is to record a better substitute for those who do not follow the International Code. Mr. C. Davies Sherborn, while engaged upon his invaluable work the *Index Animalium*, noted the introduction of the genus *Flammea*, and with his usual generosity brought it to my notice, and has allowed me this opportunity of making it publicly known, for which my thanks are here tendered. In the *Fauna de la Moselle* by Fournel, published in 1836, the Owls are divided; and on p. 101 the genus *Flammea* is diagnosed—the type, by monotypy, being *Flammea vulgaris* Fournel=*Strix flammea* Auct.=*Strix alba* Scopoli. Consequently, those who would reject *Tyto* Billberg, 1828, may use *Flammea* Fournel, 1836, for the Barn Owls, this name having priority over *Hybris* Nitzsch."

Hartert did not mention my work when he brought this forward.

The following year the opportunity of criticising Billberg's work, of which only one copy is known to exist in the British Islands, was given Iredale and myself, and a good account of it appears in the *Austral Avian Record*, Vol. II., pp. 33-48, Oct. 23, 1913. I extract the following:

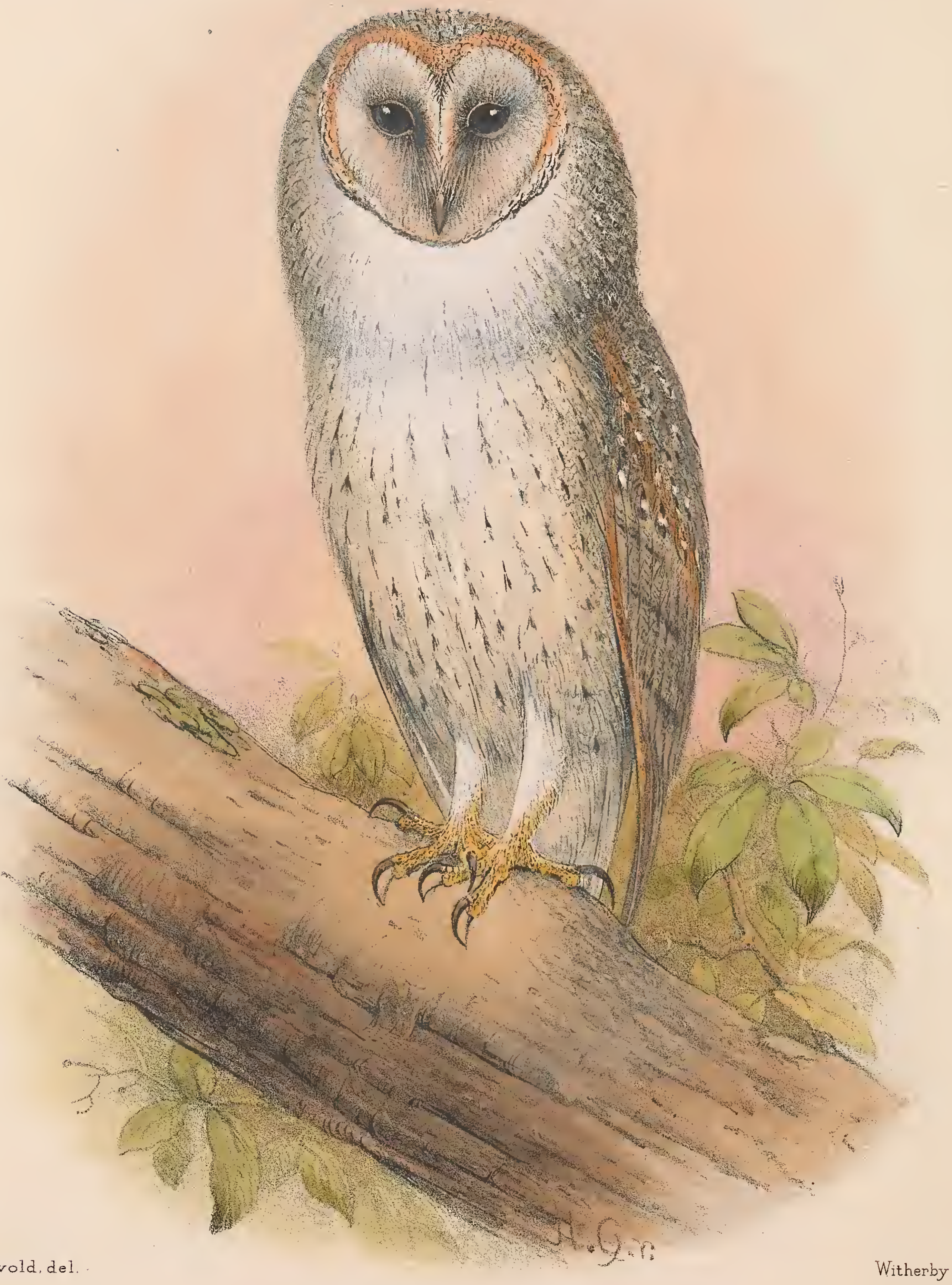
"*Tyto* for *Strix* Savigny is also accepted, as Savigny's restriction of *Strix* was unavailable owing to the fact that the species selected by Savigny was not one of the Linnean species of *Strix.* When the text of Billberg's book is consulted, we find that his work was most carefully done, as there (p. 116) he uses *Strix flammea* for the *Short-eared Owl*, and gives a long explanatory note, proving that Linné based his *Strix flammea* on the Rudbeck picture, which is undoubtedly that of this species. The *Strix flammea* of authorities, he shows to be unknown in Sweden. It is very unfortunate that Billberg's remarks should have been overlooked, as now—eighty odd years afterwards—the same, and only, conclusion is arrived at, and many ornithologists still wish to quibble over the consequences.

"In consequence of this knowledge of the invalidity of the usage of *Strix* Linné for the Barn Owl, Billberg proposed *Tyto* for that group. It has been claimed that *Tyto* is preoccupied by *Tyta*, also proposed earlier by Billberg. In this connexion it might be observed that Heine (*Nomencl. Mus. Hein. Ornith.*, p. 252, 1890) proposed *Tyto* to replace *Myotha*, 'on grounds of purism.' The meaning of '*tyto*' (*fide* Richmond, *Proc. U.S. Nat. Mus.*, Vol. XXIV., p. 720, 1902, when recording this name) is given as 'the night-owl,' while another authority cites as the meaning of '*tyta*,' 'night-flying,' apparently two different words."

Such is the history of *Tyto* and *Flammea*, and while Hartert, Jourdain, Ticehurst and Witherby in their *Hand-list of British Birds* maintained the former, the Brit. Orn. Union, 2nd edition, *List of British Birds* have preferred *Flammea*.

At present there is no stability in connection with such queries as to what constitutes invalidity as regards spelling of names, and I here retain *Tyto*.

It might be observed that when Linné proposed *Strix* in the tenth edition of his *Systema Natura* in 1758, he did not know the Barn Owl, and this species is not included among his list. Hence, by no legitimate method can *Strix* be used for the Barn Owls. Further, by tautonymy, the type of the Linnean *Strix* is the Tawny Owl, and this agrees with the Brissonian usage and the conclusions of Newton and the Americans. Upon these two matters unanimity has resulted, and the only matter in abeyance is unfortunately the one that concerns Australian students, the acceptance or rejection of *Tyto*.



H. Grönvold, del.

Witherby & Cº

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TYTO DELICATULA.

(DELICATE OWL).

Order STRIGIFORMES *Family TYTONIDÆ.*

No. 320.

TYTO ALBA.

DELICATE OWL.

(Plate 268.)[*]

STRIX ALBA Scopoli, Annus I., Hist. Nat., p. 21, 1769 : Italy.

Strix delicatulus Gould, Proc. Zool. Soc. (Lond.) 1836, p. 140, 1837 : New South Wales.

White-faced Owl, Latham, Gen. Hist. Birds, Vol. I., p. 334, 1821.

Strix delicatulus[†] Gould, Proc. Zool. Soc. (Lond.) 1836, p. 140, 1837 ; *id.*, Synops. Birds Austr., pt. III. (pl. 52, f. 1), 1838 ; *id.*, Birds Austr., Vol. I., pl. 31, 1848 ; Bonaparte, Consp. Gen. Av., Vol. I., p. 54, 1850 ; Gould, Handb. Birds Austr., Vol. I., p. 66, 1865 ; Ramsay, Proc. Linn. Soc. N.S.W., 2nd Ser., Vol. I., p. 1097, 1887 (N.-W.A.) : *id.*, *ib.*, Vol. II., p. 166, 1887 (N.-W.A.) ; Broadbent, Proc. Roy. Soc. Queensl., Vol. V., p. 16, 1889 (Q.) ; North, Austr. Mus. Cat., no. 4, p. 10, 1898 ; Lyons, Emu, Vol. I., p. 137, 1902 (Central) ; Hill, *ib.*, Vol. II., p. 161, 1903 (Vict.) ; Carter, *ib.*, Vol. III., p. 35, 1903 (M.-W.A.) ; D'Ombrain, *ib.*, Vol. IV., p. 127, 1905 (Vict.) ; Batey, *ib.*, Vol. VII., p. 4, 1907 (Vict.) ; Mathews, Handl. Birds Austral., p. 44, 1908 ; Hall, Emu, Vol. X., p. 53, 1910 (Tas.) ; Broadbent, *ib.*, p. 233 (N.Q.) ; Sullivan, *ib.*, Vol. XI., p. 117, 1911 (Vict.) ; North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 310, 1912 ; Macgillivray, Emu, Vol. XIII., p. 155, 1914 (N.Q.) ; Barnard, *ib.*, p. 206 (N.T.) ; Cheney, *ib.*, Vol. XIV., p. 204, 1915 (Vict.).

Strix delicatus Gould, Proc. Zool. Soc. (Lond.) 1837, p. 99.

Strix flammea (part) Sharpe, Cat. Birds Brit. Mus., Vol. II., p. 291, 1875.

Strix flammea subsp. *delicatula* Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 178, 1878 ; *id.*, Tab. List Austr. Birds, p. 2, 1888 ; *id.*, Cat. Austr., Striges, p. 9, 1890 ; North, Austr. Mus. Cat., no. 12, p. 24, 1890 ; Hall, Key Birds Austr., p. 6, 1899 ; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 51, 1901 ; Le Souëf, Emu, Vol. II., p. 86, 1902 (N.T.) ; Berney, *ib.*, Vol. VI., p. 158, 1907 (N.Q.).

Aluco delicatula Sharpe, " Voy. Erebus Terror " Birds, p. 23, 1875.

Aluco flammea delicatula Rothschild, Bull. Brit. Orn. Club, Vol. XIV., p. 89, 1904.

Tyto alba delicatula Mathews, Nov. Zool., Vol. XVIII., p. 256, 1912 ; *id.*, List Birds Austr., p. 116, 1913.

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[*] The Plate is lettered *Tyto delicatula*.

[†] Generally written *delicatula*.

Tyto alba alexandræ Mathews, Nov. Zool., Vol. XVIII., p. 256, 1912 : Alexandra, Northern Territory; *id.*, Austral Av. Rec., Vol. I., p. 56, 1912; Rothschild and Hartert, Nov. Zool., Vol. XX., p. 280, 1913.

Tyto alba Mathews, List Birds Austr., p. 116, 1913.

Tyto alba alba Mathews, *ib.*

Distribution. Australia; Tasmania, one record.

Adult male. General colour above pale dusky-brown, everywhere mottled, or freckled, with white and pervaded with sandy-rufous; the feathers on the crown of the head have subterminal brown spots, barred, and tipped with white; the upper wing-coverts, scapulars, back, and upper tail-coverts richer in colour than the head and the feathers more coarsely marked, the dark shafts and white tips forming almost continuous lines, especially on the scapulars, bastard-wing and primary-coverts; the primary- and secondary-quills are barred with brown and the greater portion of the inner webs pure white; the tail-feathers are barred and mottled with brown and sandy-buff, the mottlings becoming almost obsolete on the outer feathers which are nearly pure white; facial disc white, eyelid and spot in front of the eye dark rust-brown, the outer margin of the disc sandy-rufous with minute dots of dark brown at the tips of the feathers, becoming darker and the colour more intense on the chin and lower cheeks where the tips of the feathers are edged with blackish, the feathers at the base of the bill are bristly in texture and white in colour; under-surface silky-white with dark arrow-head spots to the feathers, which become less pronounced on the thighs and under tail-coverts; outer edge of the wing, including the outer portion of the bastard-wing, under wing-coverts and axillaries white with dark markings to the feathers; quills below pure white at the base with brown bars and mottlings on the apical portion; tail-feathers below for the greater part white, with very pale brown bars and mottlings. Bill whitish-horn; eyes slate blue; feet yellow. Total length 390 mm.; culmen 21, wing 277, tail 115, tarsus 69. Figured. Collected at Allumbar, North Queensland, on the 3rd of March, 1910.

An adult female from the same locality collected on the 19th of December, 1909, measures: culmen 22 mm., wing 286.

Nestling. " Covered with an admixture of long pure white down, and where the plumage is out of the sheaths it is precisely similar everywhere to that of the adult, except that the tail-feathers are white at the tips, and there is hardly any wash of buff on the exposed portion of them " (North).

Nest. A hole in a tree.

Eggs. Clutch, 3 (usually) to 6, white and roundish; 42-43 mm. by 32-33.

Breeding-season. May (N.T.), September to February.

In the *Gen. Hist. Birds*, Vol. I., p. 334, 1821, Latham described a " White-faced Owl. Length 20 in. or more. Bill pale; irides blue; general colour of the plumage above dull yellow, powdered with minute specks, besides which are long oval spots of white, on each of which is a black dash, giving the appearance of spots of ermine; face pure white, surrounded with a range of alternate yellow and dusky feathers; all the under-parts of the body pure white, each feather marked with a narrow dusky streak down the shaft; quills barred with dusky; tail the same; egs pale red, or flesh colour.

"Inhabits New Holland, and called Boobook, but as more than one in that country goes by the same name, it is probably what Owls are generally known by."

This description was apparently based on No. 25 of the Watling Drawings, but for some reason Latham did not give a Latin name to this.

Consequently, Gould in 1836 described the bird as *Strix delicatulus*, and this is the name by which this bird is now known.

Its life-history is not completely known, but there are some notes about it.

Gould wrote: "This is the least of the Australian Owls belonging to that section of the group to which the generic term of *Strix* has been retained; it is also the one most generally distributed. I observed it in almost every part of New South Wales that I visited; it is a common bird in South Australia, and I have also seen specimens from Port Essington. It has not yet been found in the colony of Swan River, nor can it be included in the fauna of Tasmania. Although good specific differences are found to exist, it is very nearly allied to the Barn Owl (*Strix flammea*) of our own island, and the *S. javanica* of India, and, as might be naturally expected, the habits, actions and general economy of the three species are as similar as their outward appearance; mice and other small mammals, which are very numerous in Australia, are preyed upon as its natural food. To attempt a description of its noiseless flight, its mode of capturing its prey, or of its general habits, would be merely to repeat what has been so often and so ably written relative to the Barn Owl of Europe. Although the plumage of youth and that of maturity do not differ so widely in this species as in the other Australian members of the genus, the fully adult bird may always be distinguished by the spotless and snowy whiteness of the breast, and by the lighter colouring of the upper-surface."

Mr. T. P. Austin, of Cobbora, New South Wales, has written me: "Delicate Owl. No better vernacular name could have been given to this Owl. Owing to the great mortality amongst these birds of late years, I think it is only a matter of a very short time when they will become extinct. During the last few years I have seen six dead ones about my house, and I have not seen a live bird of this species for three years. Only once have I found it nesting. I flushed the sitting bird from a very large hollow in an enormous red gum-tree growing on the bank of the Talbragar River, and from which I took three eggs."

Mr. Tom Carter has given me the following item: "The Lesser Masked Owl (*Strix delicatula*) is not uncommon in the Mid-west, being found in the hollow gum-trees of the inland rivers and creeks and recesses of the great ranges of the North-west Cape. Three incubated eggs were taken from a hollow tree inland from Pt. Cloates on September 18, 1900. I have not yet seen any specimens about Broome Hill, but am told on good authority by an old settler that he has seen two or three in the course of forty years living here."

D'Ombrain has given an interesting account in the *Emu,* Vol. IV., p. 127, 1905, from Casterton, Victoria, which I quote:

"This beautiful bird is commonly called a 'White' Owl, merely because of its much lighter coloured plumage, which contrasts with that of the darker Boobook, the comparison being made the easier because in many localities it is almost as plentiful as the Boobook. In this district it is quite as common as the Boobook, and in the year 1902, when the stock were starving in northern parts of Victoria and the great drought was still raging in the other States, these birds were exceptionally plentiful here. Yet despite the fact that all this Western District was bountifully supplied with feed for stock, the Delicate Owls were found dying and dead in numbers, and this fact I mentioned in my monthly health report to the Shire Council of Glenelg. I take the following from the report: 'With regard to the birds mentioned it may not be altogether out of place to mention in a report of this nature (as showing the presence of disease amongst all vertebrates) that no fewer than thirteen specimens of the Lesser Masked Owl have been brought under my notice, having been picked up dead or dying, some in pairs, others singly. On examination, their bodies were wasted and starved in appearance.'

"Their habits are much the same as the whole class of Owls, and the only other note I have about them is that they lay as many as three eggs, and they will take the carcass of a small rabbit to a hole in a tree and will feed on it there during daylight, as has been proved by the appearance of the recently torn flesh of a rabbit found in the 'camp' just vacated by the bird. Last season I had three 'in the down' taken from a nest. They were 'leggy' balls of down with the facial disc showing plainly. Evidently these feathers are the first to make their appearance. . . . They make a hissing sound when angry, and are very 'snappy.' The eyes deepened in colour as the bird grew, till they were inky black."

Hall has recorded the occurrence of a bird referred to this species in Tasmania, and has written (*Emu,* Vol. X., p. 53, 1910): "*Strix delicatula* Gld. may or may not be a subspecies of the European *S. flammea* Linn. Being a dimorphic form, and without being able to satisfy ourselves on the matter of their geographical plumages, there is no certainty of its true position. Recently it has been raised to the position of a species. As a species its distribution has been known to be Australia and New Guinea. On 6th May, 1910, Mr. P. J. Nicholls brought a specimen in the flesh into the Tasmanian

Museum. He found it dead near the back door of the homestead of his property at Richmond, some sixteen miles north-east of Hobart. For years past it, or its like, had frequented his outhouses. It appears to me to be a dark race of the mainland *Strix delicatula*, the vermiculations of the dorsal surface being scarcely visible. The tail is pure white, with only a faint tinge of pale orange on one portion of the upper-surface. Although one specimen is alone available for record, the white of the under-surface of it is so very clear, and the deep brownish-grey of the upper-surface so devoid of tawny or pale orange, that it appeals to me as being an insular form of the mainland species. The characteristic feature of this specimen is that it is deep brownish-grey, with scarcely any orange upon it, causing it to appear sooty on the whole of the upper-surface rather than tawny or orange. The colour of the legs is creamy and not yellow."

Miss Cheney records from Wangaratta District, Victoria (*Emu*, Vol. XIV., p. 204, 1915): "This Owl has a variety of calls; the commonest of 'Yo yo' puzzled many people for a time. It seems like the call of a sheep-drover urging on his dogs."

The succeeding notes I extract from the *Austr. Mus. Spec. Cat.*, No. 1, Vol. III., where North indicates variation as follows: "Some specimens are of a deeper orange buff on the upper-parts, which extends, but to a far less degree, to the under-parts, and more particularly the chest and upper portion of the breast. Others have the apical portion of the white feathers of the under-surface finely flecked, spotted or streaked with blackish-brown, while some have the feathers of the chest and breast pure silky white, and entirely devoid of markings."

As North was not interested in geographical variation, he does not tell us whether the variation noted was independent or dependent upon locality.

Mr. Geo. Savidge's notes read: "The Delicate Owl is fairly plentifully dispersed on the flats and maize fields of the Clarence River, and its screech may often be heard at night time. It passes the day in a hollow tree or some thick shady bush; one roosted off and on for several months in a mulberry-tree near my house at Copmanhurst. The only nesting-place I have found was during September, and was situated in a dead Grey Gum. The birds gained access to the inside of the tree through a small crack, where one could hardly get a hand through. The nesting-places contained two young ones, which were resting on a mass of ejected pellets, dead birds, etc., one examined being a half-devoured Quail. A strong and disagreeable odour was emitted by the nesting-place, and the blowflies must have been a torment to the young ones. The latter were very wild, and showed fight at once. These birds prey upon mice about my buildings in the winter months, and their screech disturbed my neighbour so much that I had difficulty in persuading him not to shoot the birds, hoping to get their eggs, but as the breeding time came round, about September, they disappeared to more secluded spots. They are back again now (May). The bird does not hoot, as has been stated, but makes a noise like (that of) an opossum, without the break that is in the latter."

Mr. K. H. Bennett of Mossgiel, N.S.W., in 1886 wrote: "*Strix delicatula* was very numerous here at the time of the rat invasion, in the early days of settlement, and disappeared after the rats left the district. During that time I found it breeding on two occasions; the eggs, six in number, rather rounded in form and dull white, were in each instance simply deposited on the soft decayed wood in the hollow trunks of trees, in a similar manner to those of Parrakeets. I have occasionally seen individuals since, but they did not remain to breed, and like all the Owl family can only be regarded as occasional visitors."

Mr. G. A. Keartland wrote from Melbourne: "The Delicate Owl may be found in almost every part of Australia, but these birds are most numerous near rivers and creeks, where they breed in the hollow limbs of the large trees. At Werribee, Victoria, I found a pair nesting in a hollow *Casuarina*, no doubt owing to the absence of large timber. Mr. Jas. F. Field secured a clutch of their eggs near Alice Springs, whilst Mr. Alex. Ross forwarded me others from Crown Point, Central Australia. On the Daly River, in the Northern Territory of South Australia, and near the Fitzroy River, North-western Australia, they are very numerous, probably owing to the presence of large numbers of small marsupials, besides rats and mice. Whenever mice make their appearance in exceptionally large numbers in Victoria, the Delicate Owl seems to follow them, but when the mice disappear, many of the Owls may be seen lying about dead and in very lean condition, some little better than skeletons."

Though North has recorded variation, the series here available is not sufficient to define the geographical races existent in Australia. I separated the Northern form, but as Rothschild and Hartert have explained, I made a mistake in the measurements. I admit this, and have therefore accepted their rectification, but this does *not* mean that definable races do *not* exist in Australia, but simply that with the material at my disposal I cannot define them. In this Owl, according to Rothschild and Hartert's standard, the slightest difference is quite sufficient to establish a subspecies on, if the locality differs, but to them "Australia" is one locality and is strictly comparable with the islands of Madeira, Cape Verde, East Canaries, Celebes, Tenimber and Timorlaut, or Sumba, each of which provides its own subspecies.

DELICATE OWL.

Hartert, in his *Vögel der Palaärk. Fauna*, Vol. II., p. 109, gives the names of the forms of extra European Barn Owls he admits. I extract these, as probably the study will prove of interest to my readers:

Tyto alba	*guttata* (Brehm)	North Europe.
	alba (Scopoli)	Mediterranean countries through France, including the British Isles.
	ernesti (Kleinschmidt)	Sardinia.
	schmitzi (Hartert)	Madeira.
	gracilirostris (Hartert)	East Canaries.
	detorta (Hartert)	Cape Verde Isles.
	maculata (Brehm) recte *affinis* (Blyth)	Africa.
	javanica (Gmelin)	India, Java, etc.
	deroepstorffi (Hume)	Andamans.
	rosenbergi (Schlegel)	Celebes.
	sororcula (Sclater)	Tenimber and Timorlaut.
	sumbaensis (Hartert)	Sumba Island.
	meeki (Rothschild and Hartert)	British New Guinea.
	delicatula (Gould)	Australia.
	lulu (Peale)	Samoa and Tonga.
	bargei (Hartert)	Curaçao.
	pratincola (Bonaparte)	North America.
	guatemalæ (Ridgway)	Central America.
	contempta (Hartert)	West Ecuador and Venezuela.
	perlata (Lichtenstein) recte *tuidara* (Griffiths and Pigeon)	Guiana and Brazil.
	furcata (Temminck)	Jamaica and Cuba.
	punctatissima (Gray)	Galapagos Island.
	nigrescens (Lawrence)	Dominica.
	insularis (Pelzeln)	St. Vincent.
	glaucops (Kaup)	S. Domingo, Hayti.

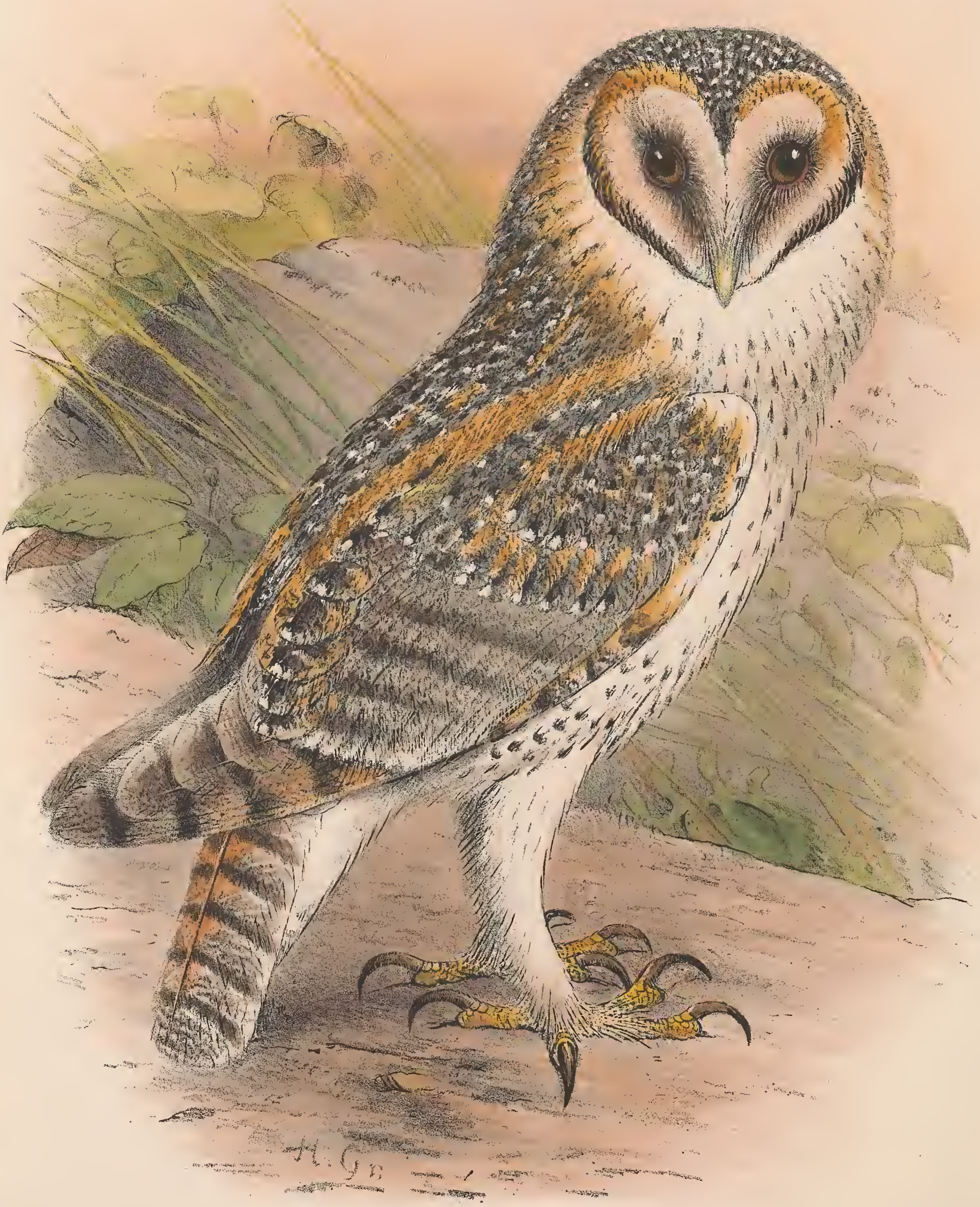
It will be noticed that almost any island may produce an isolated form, and there are a number of "islands" on the mainland of Australia, as well as off it, as I have continually pointed out, so that we can anticipate a fair number of subspecies of this Owl being recognised later in Australia.

Since the preceding was in print, Brasil (in the *Revue Française d'Ornithologie*, 7 year, p. 202, Jan. 7, 1916) has recorded *Tyto alba lulu* (Peale) for New Caledonia, and has described *Tyto alba lifuensis* from Lifu, which does not seem right on geographical grounds alone.

As the species name of the Owl, *alba* is used, and I here give the reasons for the rejection of *flammea*, which is especially important, as this is retained as a "nomen conservandum" in the British Ornithologists' Union List of British Birds, 2nd edition.

In the twelfth edition of Linné's *Systema Naturæ*, published in 1766, a species was named *Strix flammea*. Through some inexplicable misunderstanding this became recognised as the Barn Owl. As noted previously, Billberg as long ago as 1828, writing upon the birds of Sweden, where Linné lived and whence he described his *Strix flammea*, intimated that this was not the Barn Owl, which was not a native of Sweden, but the Short-eared Owl. No one took much notice of this correction, so that the error persisted, but in recent years the matter has again been investigated and the same result arrived at. This meant the rejection of the specific name *flammea* in connection with the Barn Owl and its use for the Short-eared Owl. Moreover, it was found that Pontoppidan in 1763, three years before Linné used the name, had figured in his Danish Zoology the Short-eared Owl under the name *Strix flammea*. The next name in chronological order, or rather the first name given to the Barn Owl, is *Strix alba*, proposed by Scopoli for an Italian bird.

British ornithologists of the older school, more concerned with customary usage than accuracy, have endeavoured to retain *flammea* for the Barn Owl. This misuse has so prejudiced one of the Committee, Mr. W. R. Ogilvie-Grant, that when dealing with New Guinea birds he has exaggerated the error by calling an Owl *Flammea flammea novæhollandiæ* (*Ibis*, Jubilee Suppl., No. 2, Dec. 1915, p. 258). The species *Tyto alba* (=*Flammea flammea* Ogilvie-Grant) and *Tyto novæhollandiæ* are two very distinct species, as even Mr. Ogilvie-Grant will admit when he notices the error.



H. Grönvold. del.

Witherby & Co.

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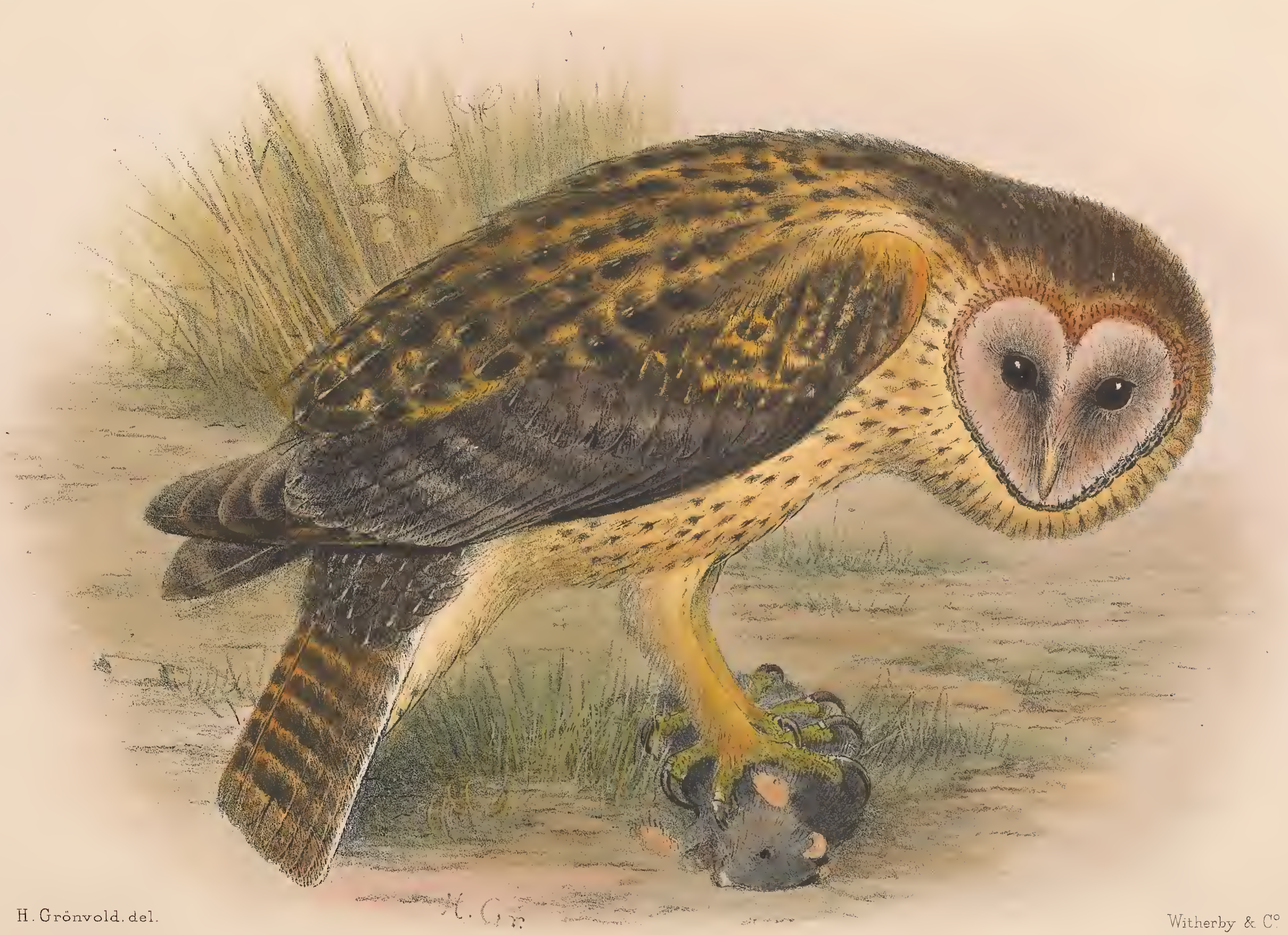
TYTO NOVÆ-HOLLANDIÆ.

(CHESTNUT-FACED OWL).



H. Grönvold. del.

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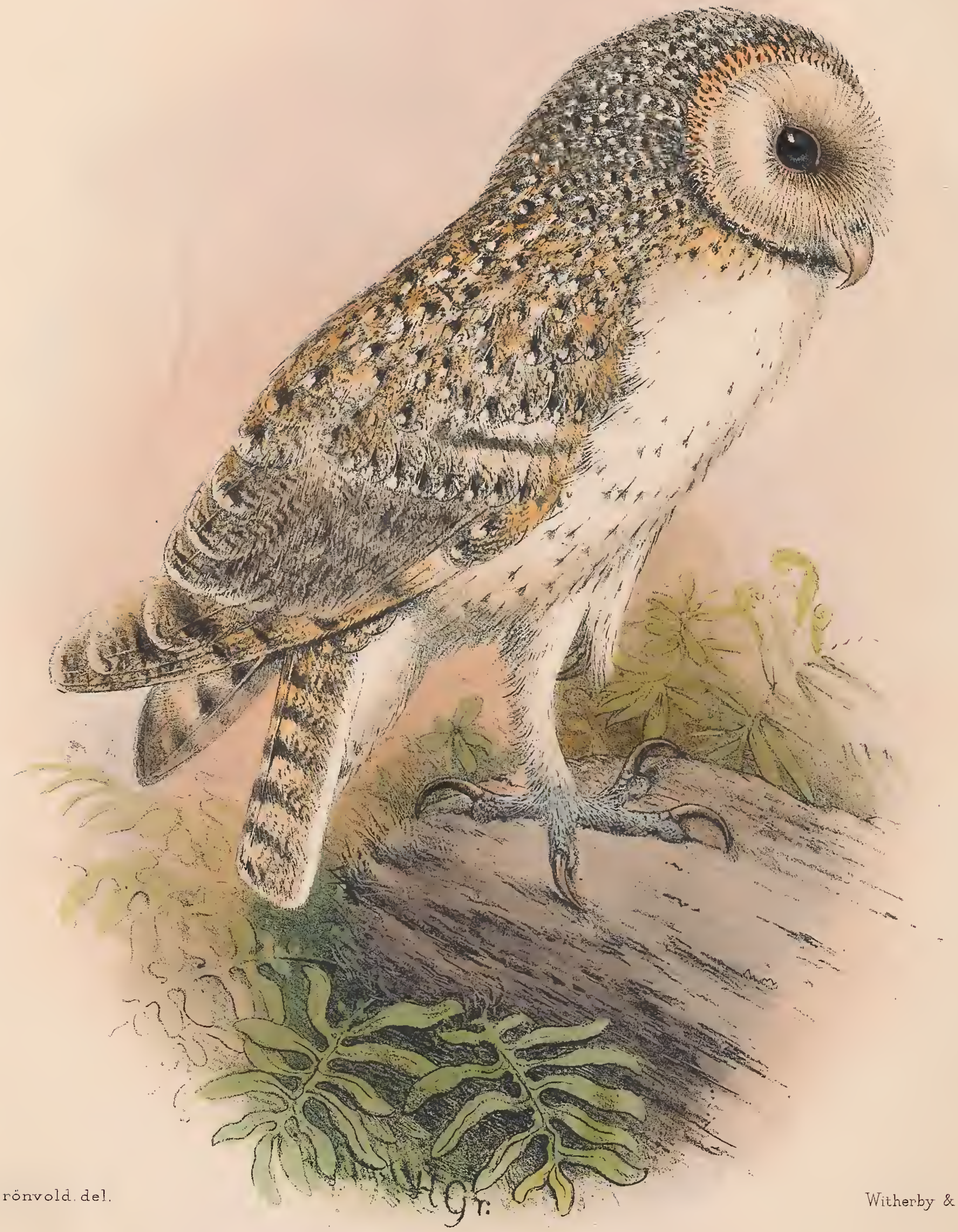
TYTO CASTANOPS.

(MASKED OWL).



H. Grönvold. del.

Witherby & C°

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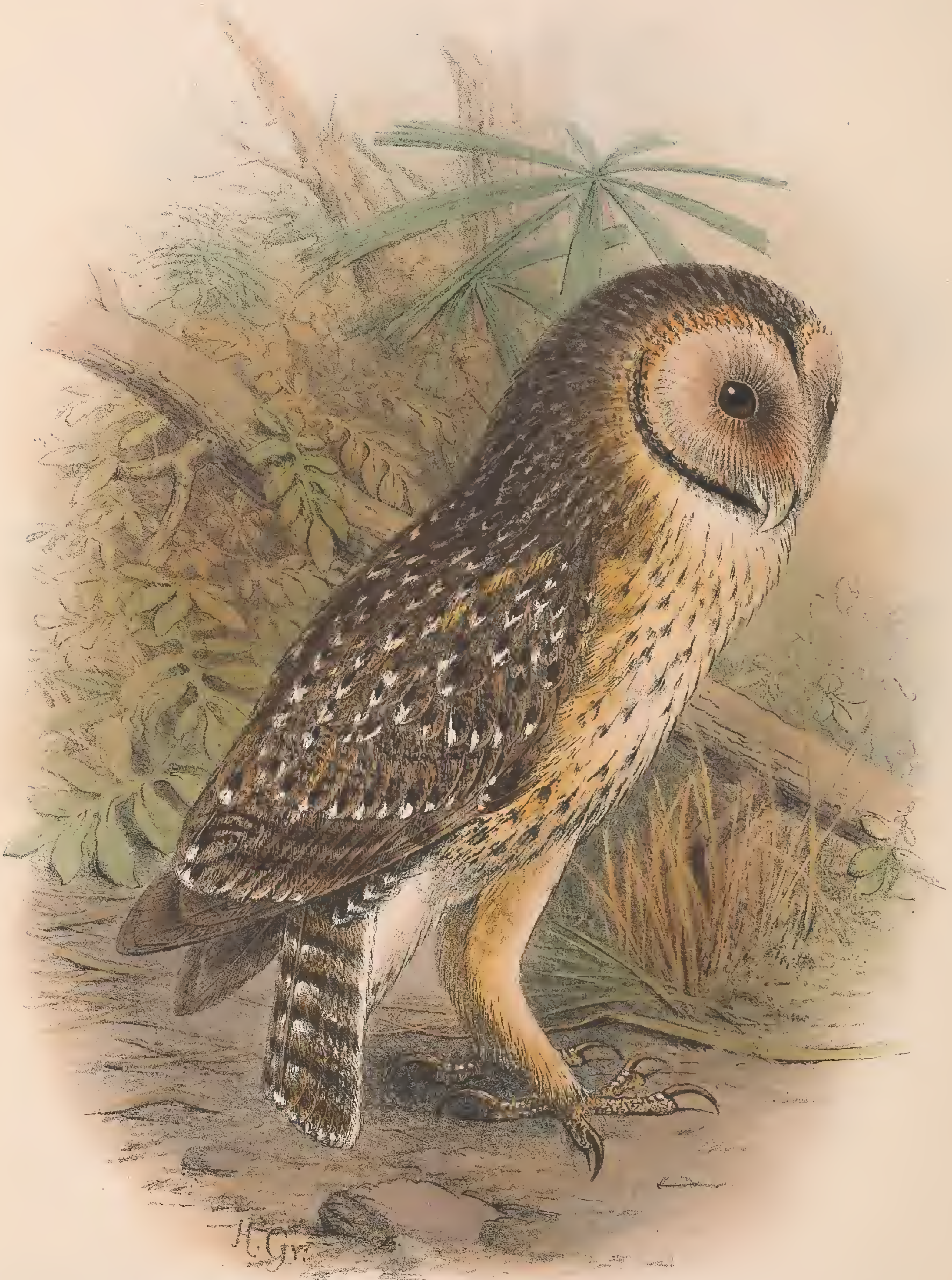
TYTO KIMBERLI.

(WESTERN CHESTNUT-FACED OWL).



H. Grönvold, del. Witherby & Cº

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TYTO MELVILLENSIS.

(NORTHERN CHESTNUT-FACED OWL).

No. 321.

TYTO NOVÆHOLLANDIÆ.

MASKED OWL.

(Plates 269, 270, 271 and 272.)*

Strix ? novæhollandiæ Stephens, in Shaw's Zool., Vol. XIII., pt. ii., p. 61, 1826: Australia=New South Wales.

Mouse Owl, Latham, Gen. Hist. Birds, Vol. I., p. 358, 1821.

Strix ? novæhollandiæ Stephens, in Shaw's Gen. Zool., Vol. XIII., pt. ii., p. 61, 1826; Strickland, Ornith. Synon., p. 181, 1855; Gould, Handb. Birds Austr., Vol. I., p. 64, 1865; Sharpe, Cat. Birds Brit. Mus., Vol. II., p. 303, 1875; *id.*, Ornith. Miscell. (Rowley), Vol. II., p. 15, 1876; Ramsay, Proc. Zool. Soc. (Lond.) 1875, p. 380 (Q.); *id.*, Proc. Linn. Soc. N.S.W., Vol II., p. 178, 1878; *id.*, Tab. List Austr. Birds, p. 2, 1888; *id.*, Cat. Austr., Striges, p. 1, 1890; North, Austr. Mus. Cat., no. 4, p. 1, 1898; Hall, Key Birds Austr., p. 6, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 50, 1901; Le Souëf, Emu, Vol. II., p. 86, 1902 (N.T.); D'Ombrain, *ib.*, p. 184, 1903 (Vict.); Le Souëf, *ib.*, Vol. III., p. 113, 1903 (Tas.); D'Ombrain, *ib.*, Vol. IV., p. 126, 1905 (Vict.); Mathews, Handl. Birds Austral., p. 44, 1908; Batey, Emu, Vol. IX., p. 241, 1910 (Vict.); Crossman, *ib.*, Vol. X., p. 112, 1910 (N.-W.A.); North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 314, 1912.

Strix personata (not Daudin 1800) Vigors, Proc. Zool. Soc. (Lond.) 1831, p. 60: Australia =New South Wales; Gould, Synops. Birds Austr., pt. iii. (pl. 51, fig. 1), 1838; *id.*, Birds Austr., Vol. I., pl. 29, 1848; Bonaparte, Consp. Gen. Av., Vol. I., p. 54, 1850.

Strix castanops Gould, Proc. Zool. Soc. (Lond.) 1836, p. 140, 1837: Tasmania; *id.*, Synops. Birds Austr., pt. iii. (pl. 51, fig. 2), 1838; *id.*, Birds Austr., Vol. I., pl. 28, 1848; Bonaparte, Consp. Gen. Av., Vol. I., p. 54, 1850; Gould, Handb. Birds Austr., Vol. I., p. 62, 1865; Diggles, Ornith. Austr., pt. xiii., 1867; Sharpe, Cat. Birds Brit. Mus., Vol. II., p. 304, 1875; *id.*, Ornith. Miscell. (Rowley), Vol. II., p. 17, 1876 (Tas.); Ramsay, Proc. Linn. Soc. N.S.W., Vol. II., p. 178, 1878; Legge, Papers Proc. Roy. Soc. Tasm. 1886, p. 237, 1887 (Tas.); *id.*, *ib.*, 1887, p. 85, 1888 (Tas.); Ramsay, Tab. List Austr. Birds, p. 2, 1888; *id.*, Cat. Austr., Striges, p. 4, 1890; North, Austr. Mus. Cat., no. 4, p. 4, 1898; Hall, Key Birds Austr.,

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* Plates lettered *Tyto novæhollandiæ*; *Tyto castanops*; *Tyto kimberli*; *Tyto melvillensis.*

p. 6, 1899; Legge, Emu, Vol. I., p. 82, 1902 (Tas.); Mathews, Handl. Birds Austral., p. 44, 1908; Fletcher, Emu, Vol. IX., p. 81, 1909 (Tas.); Littler, Handb. Birds Tasm., p. 11 , 1910 (Tas.); Cheney, Emu, Vol. XIV., p. 205, 1915 (Vict.); H. L. White, *ib.*, Vol. XV., p. 60, 1915.

Strix cyclops Gould, Proc. Zool. Soc. (Lond.) 1836, p. 140, 1837: New South Wales; *id.*, *ib.*, 1837, p. 99; *id.*, Synops. Birds Austr., pt. III., pl. 52, fig. 2, 1838.

Strix novæhollandiæ subsp. *castanops* Ramsay, Tab. List Austr. Birds, p. 2, 1888; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 50, 1901; D'Ombrain, Emu, Vol. IV., p. 128, 1905 (Vict.)

Tyto novæhollandiæ novæhollandiæ Mathews, Nov. Zool., Vol. XVIII., p. 257, 1912; *id.*, List Birds Austr., p. 117, 1913.

Tyto novæhollandiæ castanops Mathews, Nov. Zool., Vol. XVIII., p. 257, 1912; Rothschild and Hartert, Nov. Zool., Vol. XX., p. 283, 1913; Mathews, List Birds Austr., p. 117, 1913.

Tyto novæhollandiæ perplexa Mathews, Nov. Zool., Vol. XVIII., p. 257, 1912: East Beverley, West Australia; Rothschild and Hartert, Nov. Zool., Vol. XX., p. 280, 1913; Mathews, List Birds Austr., p. 117, 1913.

Tyto novæhollandiæ kimberli Mathews, Nov. Zool., Vol. XVIII., p. 257, 1912: East Kimberley, North-west Australia; Rothschild and Hartert, Nov. Zool., Vol. XX., p. 281, 1913.

Tyto novæhollandiæ mackayi Mathews, Austral Av. Rec., Vol. I., p. 34, April, 1912: Mackay, Queensland; Rothschild and Hartert, Nov. Zool., Vol. XX., p. 281, 1913.

Tyto novæhollandiæ whitei Mathews, Austral Av. Rec., Vol. I., p. 34, April, 1912: Adelaide, South Australia; Rothschild and Hartert, Nov. Zool., Vol. XX., p. 281, 1913.

Tyto novæhollandiæ riordani Mathews, Austral Av. Rec., Vol. I., p. 35, 1912: Warrnambool, Victoria; Rothschild and Hartert, Nov. Zool., Vol. XX., p. 281, 1913.

Tyto novæhollandiæ melvillensis Mathews, Austral Av. Rec., Vol. I., p. 35, 1912: Melville I., Northern Territory; Rothschild and Hartert, Nov. Zool., Vol. XX., p. 282, 1913; Mathews, List Birds Austr., p. 117, 1913.

Tyto galei Mathews, South Austr. Ornithologist, Vol. I., p. 12, 1914: Pascoe River, North Queensland.

Tyto longimembris dombraini Mathews, Austral Av. Rec., Vol. II., p. 91, Sept. 24, 1912: Victoria.

? *Strix delicatula* Hill, Emu, Vol. X., p. 268, 1911 (N.-W.A.)

DISTRIBUTION. Australia; Tasmania.

Adult female. General colour above dark brown or blackish-brown, with white mottlings and spear-head or V-shaped markings to the feathers on the hinder-crown, hind-neck, back, scapulars and upper wing-coverts, and an admixture of orange-buff here and there; flight-quills irregularly banded with brown and largely toothed with white on the inner webs; middle tail-feathers also banded with brown, becoming paler on the outer feathers where the extent of white is much increased; facial disc, which is composed of disintegrated and hair-like feathers buffy-white, a spot in front of the eye and eyelashes black, the feathers on the middle of the crown tipped with black, like the collar on the lower throat, and a circular line on the hinder-cheeks, those on the sides of the crown and behind the ear-coverts orange-buff minutely tipped with black; chin and throat creamy-white; fore-neck, vent and short under tail-coverts silky white; middle and sides of breast, abdomen and sides of the body white with dark brown markings on the middle of the feathers, all of which are tinged with orange-buff; long under tail-coverts white with pale brown markings like the thighs; tarsi tinged with buff; axillaries and under wing-coverts white spotted with blackish-brown, the outer or marginal coverts tinged with orange-buff. Bill white; eyes dark hazel; feet whitish. Total length 535 mm.; culmen 27, wing 343, tail 155, tarsus 79. Figured. Collected at Warrnambool, Victoria, on the 24th of January, 1907, and is the type of *Tyto novæhollandiæ riordani*.

Immature. General colour above blackish-brown minutely mottled with white, and arrow-head marks of the same colour at the tips of the feathers, the latter sharply contrasting with the dark pattern, the base of the feathers dark ash-colour and the sub-apical portion irregularly marked with ferrugineous-buff; scapulars, upper wing-coverts, crown of head and hind-neck like the back, as are also the bastard-wing and primary-coverts; primary- and secondary-quills somewhat paler than the back blotched with ferrugineous on the outer webs, while the inner webs are for the most part buff, more especially towards the base; on a great many of the quills the dark pattern assumes the form of bars, the innermost secondaries are like the back; tail-feathers barred and mottled with brown and ferrugineous, more or less whitish at the tips, and an indication of narrow whitish bars; facial disc cinnamon-brown, darker on the outer margin where the feathers are edged with black, a black spot immediately in front of the eye; the feathers surrounding the base of the bill are coarse and bristly in texture; under-surface pale rufous with brown spots and whitish markings to the feathers on the breast, abdomen, axillaries, thighs and under tail-coverts; under wing-coverts similarly marked, but the rufous rather more uniform and brighter like the edge of the wing; greater series of the under wing-coverts and quill-lining isabelline-buff barred and mottled with brown, which is darker and more intense towards the tips of the quills; lower aspect of tail somewhat similar. Total length 460 mm.; culmen 25, wing 301, tail 125, tarsus 63. Collected at Warrnambool, Victoria, on the 9th of May, 1914.

Nest. "A hole 8 inches across by 18 inches deep, 45 feet high, in a red gum tree, the floor of the nest about 4 feet down" (D'Ombrain).

Egg. Clutch, two ?. "Pearly-white. Slight lustre and smooth fairly even surface and fine texture. Rounded, breadth 1.5 inches: length about 2 inches." (D'Ombrain, Casterton, Victoria.)

Breeding-season. December.

Adult female. General colour of the upper parts blackish-brown, minutely speckled with greyish-white, and with pale tawny or sandy-rufous profusely intermixed, including the head, entire back, upper tail-coverts and upper wing-coverts, as also the bastard-wing and primary-coverts; primary- and secondary-quills paler than the back, mottled with rufous on the outer webs, which fades out on the secondaries, inner webs with coarsely-mottled bars and notched with white, the white increasing in extent on the inner secondaries, the innermost secondaries like the back; middle tail-feathers dark brown like the back barred with tawny-rufous, these bars are almost obsolete on the outermost feathers which have the outer webs and tips more or less whitish; facial disc smoky-white, the outer margin cinnamon-rufous with dark brown tips to the feathers on the fore-head and behind the eyes becoming dull white with blackish tips on the chin and lower cheeks; entire under-surface, including the under tail-coverts, thighs, axillaries, sides of body and under wing-coverts sandy-rufous, much paler and inclining to white on the vent and under tail-coverts, deeper in colour and inclining to tawny on the under wing-coverts with dark brown pear-shaped spots and shaft-lines to the feathers everywhere ; under-surface of quills brown with pale mottled bars, becoming white towards the base ; lower aspect of tail-feathers similar to those of the quills ; the bases of the feathers on the upper-surface dusky-grey like those on the breast and sides of the body, and white on those of the abdomen, thighs and under tail-coverts. Total length 570 mm. ; culmen 28, wing 370, tail 174, tarsus 73. Figured. Collected in Tasmania.

An adult male collected at Evandale, Tasmania, on the 14th of June, 1915, measures : culmen 22 mm., wing 331, tail 139, tarsus 65.

Adult male. General colour above blackish-brown minutely speckled with white and small lanceolate markings of the same colour, the subapical portion of the feathers orange-buff and the bases dusky-grey ; the lesser marginal upper wing-coverts orange-buff with a few small dark markings to the feathers ; bastard-wing and primary-coverts similar to the back but more coarsely marked ; primary-quills blackish-brown with ferrugineous mottled patches along the outer webs, the inner webs largely toothed with white ; the secondaries similar, but the ferrugineous patches replaced by grey and the inner webs are almost uniform white, except towards the tips where the dark brown encroaches in the form of broken bars ; tail-feathers brown irregularly and narrowly barred with rufous and speckled with white at the tips, the inner webs of the outer-feathers more or less white which increases towards the outer-feathers, where the brown portion assumes the form of bars with more or less buff near the shafts ; outer margin of facial disc white at the base, subapically orange-buff and tipped with blackish-brown, the remainder smoky-white with a blackish patch in front of the eye, the feathers at the base of the bill coarse in texture ; under-surface white with a tinge of pale orange-buff on the abdomen, sides of the body, outer under wing-coverts, and more intensely on the sides of the upper-breast with small dark pear-shaped spots to the feathers on the lower breast, abdomen, sides of the body, axillaries, under wing-coverts, and more sparsely on the under tail-coverts. Total length 410 mm. ; culmen 25, wing 323, tail 135, tarsus 73. Collected near Hobart, Tasmania.

Adult female. General colour of the upper-parts pale brown coarsely mottled and largely spotted with white and an admixture of orange-buff on the hind-neck, back, scapulars and wings, including the primary-quills ; the scapulars are banded with brown, some of which are almost entirely white ; primary- and secondary-quills banded with brown, the basal portion and the inner webs for the most part white ; tail banded with brown, barred with brown on the middle feathers, becoming paler towards the outer pair which are white, with a few brown markings on the shafts ; facial disc white tipped with or edged with black, the feathers behind the eye isabelline, those immediately in front of the eye dark brown or blackish, and those surrounding the base of the bill disintegrated and bristly ; throat and entire under-surface silky-white with minute shaft-streaks or subapical spots on the feathers of the breast, abdomen, thighs, under tail-coverts, sides of the body, axillaries and under wing-coverts. Bill white ; eyes blue-black; feet bluish. Total length 460 mm. ; culmen 28, wing 328, tail 152, tarsus 68. Figured. Collected at Admiralty Gulf, North-west Australia, on the 20th of November, 1911.

Nest. " A deep hollow in a eucalyptus tree " (Le Souëf).

Eggs. " Clutch, one (to three ?), dull white, finely pitted, 1.79 × 1.40 inches (Le Souëf, Port Darwin District, Northern Territory).

Breeding-season. June.

Adult (? sex). General colour above dark brown freckled with white, and V-shaped or spear-head markings on the hinder-crown ; hind-neck, sides of neck, back, wings and tail brown with orange-buff intermixed ; primary- and secondary-quills banded with brown and largely notched with white on the inner webs ; tail-feathers similar but the brown on the outer feathers paler; facial disc white, the outer circle tipped with orange-buff and black, the feathers surrounding the eye and base of the bill buffy-white in colour, disintegrated and hair-like in structure, a spot in front of the eye and eyelash black; throat and entire under-surface white, tinged with orange-buff on the breast, abdomen, thighs and under tail-coverts and irregularly marked with brown on these parts as well as the under tail-coverts. Bill white; cere fleshy-white; iris brown; orbits dull reddish-purple; feet whitey-brown. Total length 430 mm.; culmen 26, wing 302, tail 127, tarsus 66. Figured. Collected at Melville Island, off Northern Territory, on the 17th of June, 1912.

Immature female. General colour of the upper-surface, including the head, back, wings and tail dark brown, with white tips and white mottlings to the feathers, the bases dusky-grey and the subapical portion orange-buff; bastard-wing and primary-quills like the back, primary- and secondary-quills somewhat paler than the back with incomplete ferrugineous bars which fade into buff on the inner webs; tail similar to the back but paler in colour and more coarsely marked, the dark pattern assuming the form of bars and the outer feathers for the most part white; facial disc smoky-white, cheeks and sides of throat paler and inclining to white, the outer margin of the disc chestnut minutely marked with black and white above and behind the eye, becoming paler on the lower cheeks and throat, where the feathers are edged with blackish at the tips like those on the chin, the feathers immediately surrounding the eye black, which is increased in extent in front of the eye; breast, abdomen, thighs, sides of the body, axillaries and under wing-coverts orange-buff, the feathers marked with brown and white, some of the inner under wing-coverts paler and inclining to white instead of buff; lower abdomen, vent, inner portion of the thighs and under tail-coverts white, the last having a few pale brown spots; quill-lining and greater series of the under wing-coverts buffy, barred and mottled with brown. Bill white, the base and orbits light purple; eyes brown; feet whity-brown. Total length 405 mm.; culmen 25, wing 315, tail 129, tarsus 68. Collected on Melville Island on the 26th of October, 1911.

As hereafter detailed, this Owl was known to Latham, probably from a drawing made by Watling, but very little of its habits are yet known.

The peculiarities of coloration have been the cause of more notes than inquiry into its habits. The more technical matter will follow, but I find it impossible to altogether dissociate the two, so the notes immediately given are more or less disconnected and fragmentary. Two "species" were long separated, though most of the writers knew they were more closely related, and I here give notes of both together; through confusion of locality prohibiting a better arrangement, Gould's account will sufficiently indicate this problem.

Of *Strix castanops* he wrote: "Tasmania and probably the brushes of the opposite coasts of Victoria and New South Wales are the native countries of this Owl, a species distinguished from all the other members of its genus by its great size and powerful form. . . . Forests of large and thinly scattered trees, skirting plains and open districts, constitute its natural habitat. Strictly nocturnal in its habits, as night approaches it sallies forth from the hollows of the large gum-trees, and flaps slowly and noiselessly over the plains and swamps in search of its prey, which consists of rats and small quadrupeds generally. I regret that the brevity of my stay in Tasmania did not admit of sufficient opportunities for observing this bird in its native haunts, and of making myself acquainted with the various changes which take place in the colouring of its plumage. Considerable variety in this respect occurred among the specimens I collected, not so much in the form of the markings as in the hue which pervades the face, neck, under-surface and thighs. In some these were deep rusty yellow; in others the same parts were slightly washed with buff, while others, again, had the face of a dark reddish buff approaching to chestnut, and the under-surface much lighter. I have also seen others with the facial feathers lighter than those of the body, and, lastly, some with the face and all the under-surface pure white, with the exception of the black spots which are to be found in all. Whether the white or the tawny plumage is the characteristic of the adult, or whether these changes are influenced by season, are points that might be easily cleared up by persons resident in Tasmania; and I would invite those who may be favourably situated for observation to fully investigate the subject, and make known the results. The sexes differ very considerably in size, the female being by far the larger, and in every way more powerful than the male."

Of *Strix novæhollandiæ* Gould observed: "This bird, although nearly allied to the preceding, differs in so many essential characters as to leave little doubt in my mind of its being specifically distinct. It is confined to the continent of Australia, over which it enjoys a wide range. With the exception of the north coast, I have received specimens from every part of the country. During my visit to the interior of South Australia, numerous individuals fell to my gun, which upon comparison presented no material variation from others killed in New South Wales and Western Australia. If I were puzzled with respect to the changes to which the *Strix castanops* is apparently subject, I am not less so with those of the present bird; for although I find the tawny and buff colouring of the face and under-surface is generally lighter, I also find a diversity in the colouring of the different parts of the under-surface; in some specimens the face, all the under-surface, and the ground-colour of the upper are pure white. Prior to my visit to Australia I characterized specimens thus coloured as a distinct species under the name *Strix cyclops*, but I now believe them to be one of the states of plumage of the present bird, which ornithologists are inclined to consider was first described by Stephens under the name of *S. novæhollandiæ*. I may remark that, out of the numerous examples I killed in South Australia in the month of June, I did not meet with one in the white plumage. . . .

The *Strix novæhollandiæ* is almost a third smaller than the *S. castanops*, and as the sexes of both species bear a relative proportion in size, the male of the one is about equal to the female of the other. The white spottings of the upper-surface of the former are larger than those of the latter, and the surrounding patches of dark brown and buff are not so deep, giving the whole of that part of the bird a more marbled or speckled appearance."

In the *Emu*, Vol. III., p. 113, 1903, pl. vi. illustrates an Owl with the nestling-down remaining on its legs, which is given by H. C. Thompson from a specimen killed in Tasmania.

D'Ombrain furnished a long account to the *Emu*, Vol. IV., p. 126-128, 1905, of these Owls, in his notes on the Casterton District, Victoria, birds. Under the name Masked Owl (*Strix novæhollandiæ*) he wrote: "These Owls play great havoc with the rabbits caught in the traps set by the rabbiters. It was by this means that a good live specimen was caught and given to me. The trap was 'muffled' and a freshly-killed rabbit placed near it. In a few minutes the Owl flew down from a fence post, where he had been watching the proceedings, and walked into the trap, and was promptly secured. The nest-hole, and indeed any hole used for camping in, of both this and the Lesser Masked Owl, has always a great quantity of bones of rabbits and birds in it, and the ground at the foot of the tree is always dotted about with castings, or 'pellets,' of the undigested parts of their food. I have also seen the bones of the lesser flying squirrel (*Phalanger*) in the hollow. Many declare that the Masked Owl attacks very young lambs, but this is scarcely proven. The bird I had alive measured 3 ft. 8 in. from tip to tip of wings, had enormous talons, and when standing upright measured about 24 inches. . . . The colouring of the plumage is very beautiful. All the back of head, wings and tail much resemble in colour the fur of a tortoiseshell cat. The breast is snow-white, but sparingly spotted with black, the spots not large, and situated at the end, or tip, of the shaft of the feather. The bill is of horn-colour for about a third of the distance from the tip, shading gradually to a purple colour at the base. The facial disc is composed of fine, stiff, silvery feathers, which broaden at the tips, giving them an oar shape, some having a warm wash of purplish hue, deepening round the eyes, which are liquid or inky blue-black. This hue gives the disc a general purple appearance. The edge of the disc appears to be composed of two circles, the inner one containing mostly pure white, while the outer shades from fawn to umber at the tip of each feather. The umber is most marked in the lower half of the circle in the upright position, the upper showing more fawn colour. I have gone into some detail with regard to this, as it shows a decided difference from the face of the Chestnut-faced Owl, as will be seen later. Of the breast and side feathers, those that have the black spots on them have also a black streak down the shaft, uniting with the spot. The third primary is the longest feather in the wing.

"These Owls, in conjunction with some other species of their kind, have a marked peculiarity: *i.e.*, the outer barbs of the first true primary and of the first false primary-feathers have no barbules, and are turned the wrong way, like the feathers of a French 'frizzy' fowl. As I have watched Owls entering the holes in the trees, I remarked that they always fly to the hole, then settle on the edge of it, and at once turn round and go tail first into the interior of the hollow branch or hole of the tree. In performing this movement, it is very likely that the outer-barbs acquire the turned appearance from being rubbed the wrong way. This is, of course, only a theory, and I intend to ascertain if the young possess the peculiarity of turned feathers or not. The talons, toes and legs are very powerful, the toes having a covering of stiff bristles, and the lower legs soft silky ones. These Owls hunt in pairs, one keeping close to the ground, evidently beating, whilst the other flies overhead ready to swoop. They frequently follow one for quite a long distance, evidently on the look-out for any prey that one may start. These birds are best seen at full moon, but are very shy during the early quarter, seeming to gradually grow accustomed to the increasing light, when they are easily seen. The bird that flies close to the group keeps up a sort of hissing noise, and is answered by the higher flying bird in a chattering voice. When pairing is over, the birds do not frequent their usual hunting-grounds, but retire to the vicinity of their nesting-hole. Much of the above information of their habits has been gathered from the Messrs. Dancocks, who are very keen observers, and whose home is in the midst of the haunts of these birds.

"Chestnut-faced Owl (*Strix novæhollandiæ*, subsp. *castanops*). This is supposed to be a doubtful species, but I feel pretty confident that the specimen of Owl which I have got in this district is a quite distinct bird from *S. novæhollandiæ*. In this specimen the facial disc is entirely different in colour from that of the Masked Owl, having no purple hue about the face, and the circumference of the disc is a pure chestnut; also there is no ring of dark feathers on the disc at all. The under-surface of the whole bird is uniformly pure white—neither streaks nor spots on the feathers—and the general colouring of the whole of the upper-surface is much lighter, and has much more chestnut, in blotches, on it. Finally, the whole appearance is at a glance different from that of the Masked Owl, and on close inspection is markedly so. My specimen was shot in a tree along with a Delicate Owl.

They were 'hooting,' and thus drew attention to their presence. It was a male bird, and measured from tip to tip of wings 40 inches. One wing was 17 inches, and total length of bird 14½ inches. I intend having the specimen fully identified if possible."

Hill recorded from Kimberley, North-west Australia, in the *Emu*, Vol. X., p. 268, 1911, *Strix delicatula*, writing: "Very uncommon. Two examples were secured for identification, and upon examination the crops were found to contain portions of small birds and marsupials. An almost perfect specimen of the marsupial *Petaurus breviceps* was taken from one crop. These North Kimberley birds are remarkable for their large size, feathered tarsi, partial or total absence of brown spots on the under-surface and the partial or total absence of brown in the feathers of the facial disc; but, as Gould states, this fine phase of plumage, notably the spotless white of under-surface, indicates fully adult birds."

In the *Austr. Mus. Spec. Cat.*, No. 1, Vol. III., 1912, North has only written about *Strix novæhollandiæ*, and I do not understand exactly the status he would give *S. castanops*. I quote his remarks: "The Masked Owl is widely distributed over the Australian Continent, and I have specimens now before me from all the States, but not from Central and North-western Australia. Specimens in the Old Collection of the Australian Museum labelled 'New South Wales' are indistinguishable from others labelled '*Strix castanops*, Tasmania.' Mounted specimens of the latter from Tasmania are, however, slightly darker than those from New South Wales. In his notes it will be seen Mr. Malcolm Harrison refers to the variation in plumage of birds obtained in the midland and southern parts of Tasmania, the latter of which agree more closely with *Strix novæhollandiæ*. Although it may be found in Tasmania, I have never seen from that island any specimens agreeing with the birds above described (the true *cyclops* of Gould). The latter is the common form around Sydney, and it is remarkable that Gould, in his folio edition of the 'Birds of Australia,' should have figured under the name of *Strix personata* a bird more closely allied to *S. castanops* than *S. novæhollandiæ*. . . . Immature birds as a rule may be distinguished by the larger white markings on the feathers of the upper-parts, the under-parts being washed with orange buff, by the larger and more wedge-shaped markings on the under-parts, and which in still younger specimens have the feathers of the under-surface more or less crossed with blackish brown markings."

Mr. Malcolm Harrison's notes from Hobart, Tasmania, read: "My chief acquaintance with *Strix novæhollandiæ* (*castanops*) has been through the medium of the rabbit traps, in which it is not infrequently caught, and the marked difference in size and colour of the specimens so caught would almost lead one to the belief that more than one species exists in Tasmania. This can, of course, be accounted for to a large extent by age and sex, but it is a strange coincidence that nearly all the specimens of the large bold-looking bird with the dark facial disc and plumage have been noticed in the Midland and Northern Districts, whilst the smaller and lighter-coloured birds, with the discs around the eyes almost white, have been obtained in the more southern parts. Mr. A. E. Brent was the first to draw attention to this. Of course this may be quite accidental, and the experience of others may not confirm it, whilst the number of specimens examined is hardly sufficient to enable one to assert positively that such a line of demarcation exists."

Dr. Holden's observations are: "What is the present accepted opinion about *Strix castanops*? I can only say that Tasmania produces birds with deep chestnut discs and also snow-white discs, for I have handled both; particulars of other parts of their plumage I cannot supply. Probably the albinity denotes age."

North added to the above: "The series of skins of *Strix castanops* in the Australian Museum is too small, and their sex uncertain, to satisfactorily answer this question. I can speak, however, with confidence as to *Strix novæhollandiæ*, knowing the species well and by seeing specimens dissected, and that is—the smaller bird with the white facial disc is the adult male, and the slightly larger one with the white facial disc more or less stained with chestnut is the adult female, and probably the same obtains with the Tasmanian form. Gould's remarks that the Tasmanian bird is larger than the Continental one is not borne out by the examination of a series of skins in the Australian Museum."

This splendid Owl, the largest Barn Owl in the world, though not a "Barn" Owl in the strictest sense, has a very complicated history. Recently, the acquisition of specimens has caused many complications, and some considerable space is necessary to deal thoroughly with the attempts to elucidate the existent forms and to give some criticism thereof. The early history of the species is unknown, but it may have been figured by Watling, as Sharpe (*Hist. Coll. Nat. Hist. Brit. Mus.*, Vol. II., p. 112 (1906) notes: "pl. 23, Barn Owl, in Latham's MS. List, but no figure now in the book."

It is conjectured that this pl. 23 was the basis of Latham's description of his "Mouse Owl" (*Gen. Hist. Birds*, Vol. I., p. 358, 1821), which reads: "Length 17 in. or more. Bill white; face reddish buff; from the chin a chocolate mark, surrounding the margin of both the face circles, and finishing at the hind head; before the eye dusky-black; plumage above dark ash-colour, speckled with grey, dashed with white: this appearance arising from each feather having a darker spot at the end, and within this a triangular white mark; the inner webs of the feathers rusty-yellow, as in the Barn Owl; quills and tail clouded, the latter crossed with five or six bands of black, margined above and below with white; under-parts of the body and under wing-coverts pale buff, with a dull, dusky spot at the end of each feather; outer quill greatly serrated and second less so, the edges of the others smooth; legs feathered to the toes, the latter hairy; claws black. Inhabits New Holland; not unlike the Barn Owl, but darker in plumage; has the manners of it; feeds chiefly on mice, which it swallows whole, as also small reptiles."

On this account alone Stephens in Shaw's *Gen. Zool.*, Vol. XIII., pt. II., p. 61, 1861, based his *St(rix)* ? *novæhollandiæ.*

In 1831, from two Australian specimens in the Zoological Gardens, Vigors described *Strix personata.* This name was used by Gould in his "Birds of Australia," but fortunately it does not further concern us, as the name is preoccupied. When Gould first described Australian birds, he introduced in the *Proc. Zool. Soc.* (Lond.) 1836, p. 140, 1837, two species, thus: "*Strix castanops.* Str. disco fasciali castaneo, ad marginem saturatiore, et nigro circumdato; corpore supra alis caudaque laete rufo-brunneis, plumis singulis fasciis latis saturate brunneis, dispariter ornatis; capite humerisque maculis sparsis minutis albis; corpore infra flavescenti-brunneo; lateralibus colli corporisque guttis nigris sparse ornatis; femoribus tibiisque flavo-brunneis pedibus flavescentibus; rostro flavo fusco. Long. tot. 18 unc; rostri, $2\frac{1}{4}$; alae, 15; caudae, 7; tarsi, $3\frac{1}{2}$.

"*Hab.* In Terra Van Diemen.

"This is the largest known species of the restricted genus *Strix,* of which the common *Barn Owl* is a typical example.

"*Strix cyclops.* Str. disco fasciali albo, venuste annulo saturate brunneo, circumdato; corpore supra albo; dorso humerisque pallide stramineis, maculis brunneis et albis lentiginosis, primariis, fasciis alternis stramineis brunneisque; pogoniis externis apicibusque lineis brunneis rectis, frequentibus, et retortis; cauda alba fasciis brunneis; interstitiis albis brunneo crebre guttatis, corpore infra albo, maculis brunneis; femoribus tarsisque albis; pedibus flavo-fuscis; rostro livido.

"Long. tot. 15 unc; rostri, $1\frac{3}{4}$; alae, $11\frac{1}{2}$; caudae, $5\frac{1}{2}$; tarsi, $2\frac{3}{4}$.

"*Hab.* In Nova Cambria, Australi.

"This is one of the most beautiful species of the genus."

Soon afterward Gould exhibited a series of Hawks and Owls before the Zoological Society of London, and the following is the published account of the Owls (*Proc. Zool. Soc.* (Lond.) 1837, p. 99): "Four species of this genus (*Athene*) are now on the table, the two largest of which are new to science. For the largest I would propose the name of *Athene strenua*, and for the other that of *A. fortis.* The third has been characterized by Messrs. Vigors and Horsfield as the *Noctua Boobook*, and the *Noctua maculata* of these gentlemen seems to be identical with it. For the fourth and last species of the genus, which is from Van Diemen's Land, I propose the name of *leucopsis*, from the white colouring of its face. The species of the genus *Strix*, which I have called *delicatus*, together with my *Strix cyclops* and *Strix castanops* and the *Strix personata* of Messrs. Vigors and Horsfield, may be said to be closely allied but distinct species."

This extract appears to have been overlooked until I made note of it in the *Austral Avian Record*, Vol. I., p. 128, Dec. 24, 1912. Gould never referred to his name *leucopsis* again, and I suggested that *Athene leucopsis* might be *Strix cyclops*, but re-reading the quotation above showed this to be impossible. The only *Athene* known from Tasmania is *clelandi*, so the *leucopsis* appears quite indeterminable, and I placed it in Appendix B in my *List of the Birds of Australia* in 1913.

Gould maintained the two species *castanops* and *cyclops* in the "Birds of Australia," but for the latter accepted Vigors' name *personata*. In the *Handbook*, 1865, he still retained two distinct species, the name *cyclops* being, however, now rejected in favour of *novæhollandiæ*, in deference to the Law of Priority of which Gould was a strict observer, and *castanops*. Sharpe, Ramsay and North, however, more or less accepted the intergradation of these two, and while generally accepting *castanops*, just as often noted that it was a subspecies only.

In 1898 North seems to have been more or less puzzled how to treat them, as, cataloguing them as distinct species under *novæhollandiæ*, he describes two varieties, a light and a dark one, and then writes of the latter: "The facial disc is often as deeply tinted with rich dark orange-buff as that variety known as *Strix castanops* from Tasmania."

In 1912, in the *Austr. Mus. Spec. Cat.*, No. 1, Vol. III., he does not include *Strix castanops*, and his remarks are not conclusive; these I have quoted in their proper place.

On account of the variation apparent, no one attempted the determination of subspecies, North, Ramsay, etc., admitting two species or subspecies, *Strix novæhollandiæ* and *Strix castanops.* As these writers were not certain of the distribution of the subspecies, but accepted *castanops* as occurring elsewhere than in Tasmania, a reconsideration, under geographical values, was necessary.

My first attempt was made in the *Nov. Zool.*, Vol. XVIII., 1912 (Jan.), p. 257, when I prepared my "Reference List." I there admitted four subspecies as follows:

"*Tyto novæhollandiæ novæhollandiæ* (Stephens)
Queensland, New South Wales, Victoria and South Australia.

"*Tyto novæhollandiæ castanops* (Gould) .. Tasmania.

"*Tyto novæhollandiæ perplexa* Mathews .. West Australia.

"Differs from *T. n. novæhollandiæ* in its larger size and darker coloration: East Beverley, West Australia.

"*Tyto novæhollandiæ kimberli* Mathews .. North-west Australia.

"Differs from *T. n. novæhollandiæ* in its much paler coloration and smaller size: East Kimberley, West Australia."

The receipt of more material, which showed the *castanops* phase from Melville Island, indicated a further revision, and in the *Austral Avian Record*, Vol. I., pp. 34-35, Apl. 1912, I recorded:

"*Tyto novæhollandiæ mackayi*, subsp. n. Queensland.
White-faced Owl.

"Differs from *T. n. novæhollandiæ* in having the facial disc white, with the feathers round the eye chocolate at the base; it is lighter above and lacks the buff on the lower surface. Wing 315 mm. Type, Mackay, Queensland, No. 6400. Range, Queensland.

"Are there not two different species of Owls confused under *T. novæhollandiæ*? If so, those with the white facial disc must stand as *T. cyclops* (Gould), and those with the chestnut face as *T. novæhollandiæ* (Stephens).

"*Tyto novæhollandiæ whitei*, subsp. n. South White-faced Owl.

"Differs from *T. n. mackayi* in its darker upper-surface and smaller size: wing 301 mm. Type, Adelaide, South Australia, No. 913. Range, South Australia.

"*Tyto novæhollandiæ riordani*, subsp. n. Victorian White-faced Owl.

"Differs from all other subspecies of *T. novæhollandiæ* in its darker upper-surface and larger-sized wing, 343 mm. Type, Victoria (Warnambool), No. 11104. Range, Victoria.

"*Tyto novæhollandiæ melvillensis*, subsp. n. Melville Island.
Chestnut-faced Owl.

"Differs from *T. n. perplexa* in its smaller size and darker buff below

"Type, Melville Island, Northern Territory, No. 10795.

"Range, Melville Island."

This was put forward for criticism, as only by that means can we arrive at the truth in complex cases, and it got it, but in a quite unexpected manner. The result of this subdivision was an essay provided by Rothschild and Hartert, who, with no additional material, with little knowledge of local conditions, and without much study, published a paper in the *Nov. Zool.*, Vol. XX.

In order that this anti-criticism may be understood, I here reproduce Rothschild and Hartert's criticisms, with my own comments as I now view the matter.

Their criticism appeared in the *Nov. Zool.*, Vol. XX., pp. 280-284, June 1913, and is entitled "On some Australian Forms of *Tyto.*" It begins: "We have both always been particularly interested in the genus *Tyto* Billb." This may be perfectly true, but had they added: "Of the Australian *T. novæhollandiæ* we have only been able to accumulate six skins, two of which are scientifically valueless, and the remaining four from three different localities," a better appreciation of their results would have been enforced. As an item of interest I note these writers quote the *wrong* volume of their *own* Journal throughout, in one case adding the *wrong* month.

Regarding *T. n. perplexa* Rothschild and Hartert comment: "The type of *T. n. perplexa* is a female, with the wing 342 mm. It would seem that Mr. Mathews had not been aware of the fact that in *T. novæhollandiæ* the sexes differ in size, the female being considerably larger, with the wings from 2 to 3 cm. longer: nor of the fact that nearly all species of the genus *Tyto* vary individually to a great extent, like so many other Owls. If he had known these facts, he could not have described a female as a new subspecies because its wings were 2 or 3 cm. longer, or because its upperside is a shade richer in colour than most other specimens of what he then considered to be *T. novæhollandiæ* in January 1912. If he splits the species up into seven or eight forms, as he did in April 1912, his *perplexa* would in any case be the same as his *kimberli* and *whitei*."

I *knew quite well* that the females were larger, and I also knew about the variability. I do not see that the series of four specimens possessed by Rothschild and Hartert was sufficient to make them proficient judges of the variation of a species whose range was the whole of Australia. We are not concerned with the variation of other Owls, but of this species, and it is not the least good attempting to judge from analogy. As a matter of fact this species does show variation when it is understood, but this cannot be done with four specimens.

I should have thought that Hartert's experience with the Barn Owl, *Tyto alba*, would have educated him to the value of small differences. Many of the subspecies he admits on inappreciable characters and with much more restricted range than "Australia." He seems altogether unable to understand the extent of this country and does not take into consideration the topography of the land.

Tyto novæhollandiæ kimberli Mathews. Rothschild and Hartert remark: "There was no justification for the separation of this supposed *kimberli* in January 1912. The type is not smaller than males of what the author called *novæhollandiæ* from other localities at that time, and the somewhat pale colour loses all significance if only one glance is cast on a pair from the South Alligator River in the Tring Museum, which differ from each other much more than the type of *kimberli* does from other specimens. *T. n. kimberli* must therefore be united with *whitei* and *perplexa*."

I was justified in separating this form, as Mr. H. L. White wrote me: "Mr. G. F. Hill shot several specimens all similar to this one," when he forwarded me another example. Moreover, the two specimens mentioned by Rothschild and Hartert are in immature (?) (female) and adult (male) plumage, the latter agreeing well with the type of *kimberli*: the former is different, inasmuch as it shows the plumage of the first or second year. My critics do not appear to have realised the fact that this bird is only dimorphic to a certain extent: they did not help me when I inquired as to whether *two* species were confused. I know now how the *two* forms are inter-related, and by this knowledge I can better interpret the one species admitted.

The form *kimberli* is distinct, and their valuation of it as *unjustified* proves that even the most excellent judges of subspecific characters, as regards Palæarctic forms, can err when dealing with an unknown fauna. The most remarkable point in this criticism is the failure of Rothschild and Hartert to take into consideration the lessons taught them by their Palæarctic studies.

Tyto novæhollandiæ mackayi Mathews. My critics write: "The diagnosis is not elucidating, as the supposed differences of *T. n. novæhollandiæ* alone are given, which Mr. Mathews does not characterize, and of which, since he now separates the South Australian and Victorian forms, there is no skin in his collection, as it must be restricted to New South Wales, according to his most recent views. All Queensland, North-west Australian and West Australian skins before us have similar white facial discs! In fact, *mackayi* is perfectly similar to *kimberli* and *whitei*."

The above criticism is peculiar, as it is not customary to characterize the typical form when describing a subspecies; it is, further, of no account whether I have New South Wales skins in my collection or not, as I am not describing my collection but dealing with the birds of Australia, and lots of material is available to me at different times which unfortunately I cannot retain in my collection. I did not restrict the species to New South

Wales: it was described from, as far as I can trace, a drawing made at Port Jackson, and that becomes automatically the type locality. It will be observed that Rothschild and Hartert state that the white facial disc is common to North and Western birds, but make no comment upon the other points I mentioned. It is also the custom to make comparisons when introducing subspecies with the nearest geographically related form, but I remark that Rothschild and Hartert do not always follow this useful rule but refer to the typical subspecies, and this in some cases is most misleading. I had noted their confusion with regard to *Trichoglossus hœmatodus* and the allied species and subspecies which Ogilvie-Grant has now indicated (*Ibis*, Jub. Supp. 2, 1915, p. 227).

Tyto novæhollandiæ whitei Math. The criticism here reads:

"The diagnosis—emphasizing a trivial difference in the colour of the upperside—clearly shows that Mr. Mathews was not aware of the great individual variations exhibited in most forms of the genus *Tyto*, and the difference in size is irrelevant; we measure the wing 307 mm. There is no appreciable difference between *whitei*, *mackayi*, *kimberli* and *perplexa*.

"We may call attention to the fact that Gould (*B. Australia*, 1) says that he never shot a 'white' specimen in South Australia, while the type of *whitei* has the underside quite white. The supposed *whitei* can therefore not be separated from *kimberli*, *perplexa*, etc."

It is surprising how confidently my critics emphasize the "great individual variation," though they had only *four* specimens from three localities to gauge and understand. Moreover, "the difference in size is irrelevant": again a definite judgment pronounced through the intensive study of four skins. It is, again, extraordinary how they misquote rather than exactly quote. Gould was only a very short time in South Australia, and he wrote: "Of the numerous examples I killed in South Australia *in the month of June* I did not meet with one in the white plumage."

I have italicised the phrase which Rothschild and Hartert omitted and which makes all the difference to the value of Gould's statement.

Tyto novæhollandiæ riordani Mathews. "Diagnosis: 'Differs from all other subspecies of *T. novæhollandiæ* in its darker upper-surface and larger sized wing, 343 mm.' We cannot agree with these statements: the upperside of the type of *riordani* is to our eyes a shade *less* deep than in the type of *perplexa*, and the wing (which we measure 351 mm.) is only 9 mm. longer than in the latter; moreover, the author evidently forgot to think of *castanops*, which is also a subspecies of *novæhollandiæ*. Worst of all, he does not state the differences from *T. novæhollandiæ novæhollandiæ*; for the latter he fixed the type locality as New South Wales, which seems to belong to the same faunal region as Victoria. Probably Mr. Mathews regards as 'typical' *novæhollandiæ* a large form with brownish face and brownish underside, inhabiting New South Wales only. If that be so, his *riordani* would probably be the same, as one of his two specimens (a young bird) is brown underneath, the other almost pure white. If we take this view, and presume that the birds from Queensland, West Australia, and North-west, as well as those from South Australia, are always white or nearly white below, the latter could be separated under Mr. Mathews' first name: *perplexa*."

The above criticism is the most interesting as it is the most accurate. When I separated the Victorian bird I suggested two species co-existed, one with brown face and one with white face. My diagnoses were drawn up under that impression, which was not fully expressed. Hence I made differential characters which were only applicable to one of the groups, which admittedly was incorrect, and thereupon I accept Rothschild and Hartert's criticism. When, however, they write: "New South Wales, which seems to belong to the same faunal region as Victoria," they are once more displaying their want of knowledge of local conditions which is so necessary to correctly interpret the fauna of a vast continent like Australia. Victoria is zoologically composed of three faunal regions, each having well-defined subspecies characterizing them, and these are now becoming well known through the researches of local ornithologists; even as the Irish Dipper, Jay and Coal Tit were recognised. Thus, South Victoria is separated from North Victoria by the Grampians; and North Victoria belongs to New South Wales zoologically; while South Victoria does *not*, and the bird-life is nearer to that of Tasmania. West Victoria is occupied by the Mallee country, which is inhabited by another faunula quite distinct from the other two Victorian faunulæ. Nevertheless; there are three faunulæ quite distinct included in the political division named Victoria. Why Rothschild and Hartert should write: "as well as those from South Australia, are always white or nearly white below" immediately after quoting Gould's note that he had never met with a white example in South Australia, is beyond my comprehension. It serves to emphasize the lack of accuracy running through the whole of their criticism.

Tyto novæhollandiæ melvillensis Mathews. To me the remarks given herewith are most amusing.

"Mr. Mathews possesses two specimens, both marked '♀'; one is apparently adult, another, unfortunately marked as the type, is a young bird with remains of down. The adult '♀' has a wing of 307 mm., which would be small for a female, but is it correctly sexed? This bird is *not* darker buff below than *perplexa*. The other specimen is underneath darker buff than *perplexa*: its wing measures over 320 mm., but cannot be relied upon, as it is a young bird. Both have the *upper* surface a shade darker than the other Owls of this species from Australia. It is therefore *possible*, but—considering the variation of Barn Owls—needs to be confirmed by a better series, that the Melville Owl differs slightly and will have to be called *melvillensis*. The material on which Mr. Mathews based his new subspecies would not have been sufficient for us to separate it."

I have termed this extract "amusing" on account of the caution displayed when dealing with an Island form. I described the form because it showed a phase previously unknown from the North Australian mainland. They doubt the sexing. Rothschild and Hartert once more return to the variation, the subject they knew so well from the continued examination of their four specimens. Further, they admit the possibility of the subspecies being admitted, but do not suggest with what they would lump it. They surely did not propose to unite it with the New South Wales form. If so, their distribution, when plotted out, would look somewhat peculiar. Again, they state that they would not have separated it. I have known them do less wise work. Hartert separated a Cape York finch as slightly paler on *one* skin, to instance an Australian example.

They then sum up: "All of which a study of these forms admits of being done at present is to assume:

"(A) *T. n. novæhollandiæ*, a larger and (underneath) darker form from Victoria and New South Wales (synonym *riordani*) to be confirmed by a series!

"(B) *T. novæhollandiæ perplexa* from the rest of Australia (underneath never brownish? and averaging smaller, synonyms *kimberli*, *mackayi*, *whitei*).

"(C) *T. novæhollandiæ melvillensis* from Melville Island—a doubtful form which rests on one adult—apparently wrongly sexed—and one juvenile specimen, and which requires further confirmation!"

The reconsideration I have given to this matter with more material and having the preceding criticisms always in view, giving them their due worth, has enabled me to present a new view of the facts (not fancies induced by examination of specimens of other species). It is somewhat peculiar that such new material should have confirmed to a great extent the imperfect results submitted by me in April, 1912, and which received such scathing condemnation at the pens of Rothschild and Hartert.

The first matter to be discussed is the one neglected by Rothschild and Hartert in their criticism and which is really the crux of the matter, viz.: "Are there not two different species of Owls confused under

T. novæhollandiæ? If so, those with the white facial disc must stand as *T. cyclops* (Gould), and those with the chestnut face as *T. novæhollandiæ* (Stephens)."

Rothschild and Hartert did not attempt to explain the variation met with in any way, though it has puzzled most workers. They simply wrote: "Last of all, we come to *Tyto novæhollandiæ castanops* from Tasmania. This subspecies is supposed to be very distinct, so that it was even kept separate by Sharpe in 1875 (*Cat. B. Brit. Mus.*, Vol. II., p. 305), who had, a few pages before, united *T. a.* '*flammea*' (Auct.) from Central Europe, *T. a. alba* from the Mediterranean, *insularis, poensis, indica, delicatula, pratincola* (!), *furcata* (!), *punctatissima*, etc., etc., etc. We quite agree that *castanops* must be separated as a subspecies on account of the generally more orange-buff upper-side, generally dark brownish under-side, brown facial disc, and averaging larger size. There are, however, specimens with the upper-side quite as in typical *novæhollandiæ*, while others have the under-side almost whitish and the facial disc much lighter. Wings ♂ 318 or 320, ♀ 350-370 mm."

As noted above, Gould described *castanops* and *cyclops*, the one with brown face and the other with white face. It may be well to use these names for the phases. The facts can then be recounted thus. In Tasmania a large Owl occurs peculiarly *castanops*, but recent researches have revealed that the *cyclops* phase also occurs there rarely. In Victoria *castanops* more rarely is found, while the *cyclops* phase appears to predominate. In New South Wales the *cyclops* phase is certainly in the majority, though the *castanops* phase seems to be found also. To the north, the *castanops* phase quite disappears and only the *cyclops* remains. In South Australia *cyclops* certainly occurs, though Gould only reported the *castanops* phase which, however, he referred to the *cyclops* species. From West Australia the *cyclops* phase is only known, but it shows an intermediate stage between this and *castanops*. From North-west Australia only the true *cyclops* phase is found, while Melville Island appears to be tenanted by the *castanops* phase.

From Melville Island I have two specimens, an immature and an adult, both of which belong to the *castanops* phase, but the former is darker and it is obvious that the adult is a paler bird. From the Northern Territory two birds have been examined from the Tring Collection, and while the adult is pure white underneath and lacks buff above, the younger bird is buffy above and heavily spotted below, showing the transition. From Victoria I have two specimens, an immature and an adult: the immature is the *castanops* phase, and the adult is the *cyclops* phase. Other specimens show the same stages. I find that North has also recorded the same item. The conclusion I draw is that the *castanops* stage is the original immature phase, and the *cyclops* plumage is the most recent evolution. This legitimate deduction explains the apparent anomalies in a satisfactory manner. We now see the reason for the non-occurrence of the *castanops* phase in the north and the recurrence of it on Melville Island, and also its retention as the fixed plumage in Tasmania and its appearance in the Southern States. It is now much more easy to deal with the subspecies, and the facts agree. Moreover, each of my subspecific names, which Rothschild and Hartert considered unjustified, will come into use to express facts. It is somewhat unfortunate that these two great systematic workers should consider philosophical matters below their notice. Did they only employ their great faculties in dealing with the philosophy of avian distribution as well as mere systematics how much would the science of ornithology be enriched!

In the present instance they kept reiterating the question of variation as explaining the differences observed in this species, whereas had they been students of zoo-geography they would have deemed some other solution a more probable one. Further, had they only been competent to discuss these Owls, with the idea that there might be a reason for the variation observed, they might have arrived at the above conclusion. It is now certain that we have here not a true dimorphism, but a partial dimorphism that is restricted to certain districts. That is, the *castanops* phase is the survival of the immature plumage, which is retained as the adult in the south with more or less frequency, according to locality, and predominating as the natural coloration in Tasmania.

In my *List of the Birds of Australia*, owing to Rothschild and Hartert's criticism, I rearranged the subspecies, reducing them to four, but this does not accord with the facts, and I here reinstate the whole of the subspecies.

In order to give some idea of this species, I have figured and fully described four from different localities. It is necessary to advocate continued collection of these Owls, as all the questions that can be suggested are not yet answerable.

I do not anticipate more adverse criticism until much more material is available. I would observe that in the interval between my subdivision in April 1912 and Rothschild and Hartert's criticism in June 1913, the part of the *Austr. Mus. Spec. Cat.*, No. 12, dealing with Owls, was published. Had these writers been familiar with Australian literature they would have referred to this work and would certainly have benefited, as there North gives the clue to the variation apparent. I might state that my own conclusions, which agree with North's suggestion, were quite independently produced from the study of the material available to Rothschild and Hartert. I must here thank Lord Rothschild for generously placing at my disposal the whole of his material for the purposes of this anti-criticism.

I now admit many subspecies, and propose to deal with them in a different order to what I usually do and commence with

Tyto novæhollandiæ castanops Gould.

Tasmania.

This is the largest subspecies and is generally brownish below. I have fully described and figured it in this place. It is, however, now known that the male sometimes (? always) loses the brownish under-surface, but the subspecies is well characterized by its size and general coloration. It is confined to Tasmania, and is especially remarkable as retaining the immature plumage as the fixed adult stage always in the female and sometimes in the male, while it has increased in size. I have quoted Mr. Malcolm Harrison's remarks that the white plumage seemed to be more southern than the brown; it is possible that the southern form is developing into a new race, but I have no evidence. No one has questioned the validity of this race, but many have quoted it from the mainland, where it does not occur.

Tyto novæhollandiæ riordani Mathews.

Victoria.

Rothschild and Hartert dismiss this, as they could not understand it: they mention *T. n. novæhollandiæ*, *castanops* and *perplexa* in connection with it, but do not seem to have formed any definite conclusion save that it must be suppressed. As a matter of fact, it must be maintained to indicate that Victoria is inhabited by a form of Owl which is different from those of other regions. I have also fully described and figured this subspecies as *Tyto novæhollandiæ*. It is separable from the preceding by being lighter above and paler below. The immature is a little darker above and buff below, as in *castanops*. Hence immatures and females have been recorded from Victoria under the name *castanops*. I have given D'Ombrain's notes on the bird he considered to be *castanops*, and have cited here as a synonym my own *Tyto longimembris dombraini*, given to D'Ombrain's specimen. When I received this bird it looked to me, as to D'Ombrain, so different that I could not determine it as a form of this species, but referred it to the Grass Owl. The upper coloration resembles somewhat that of *castanops*, with the under-surface pure white. I here fully describe it.

Adult male. General colour of the upper-surface blackish-brown, becoming paler on the scapulars, innermost secondaries and the outer aspect of the primary- and secondary-quills, the feathers everywhere speckled with white and lanceolate white markings at the tips: all the feathers are subapically pale orange-buff and the bases are dark ash-grey; the lesser marginal upper wing-coverts almost uniform orange-buff with small dark spots at the tips, outer edge of wing silky-white, primary-quills pale buff mottled and barred with brown, becoming white on the inner portion of the inner webs; secondaries similar but somewhat paler on the outer webs; tail for the most part white, with the central feathers pale buff, barred and mottled with brown, the outermost feathers waved, particularly on the outer webs; outer margin of facial disc orange-buff, the feathers more or less edged with blackish, particularly on the sides of the face, and the inner portion of the facial disc white, the feathers coarser in texture and having hair-like tips; eyelids chestnut-brown inclining to blackish in front of the eye; hinder face and sides of neck orange-buff with white bases and dark pear-shaped spots to the feathers; entire under-surface silky-white, with minute dark streaks to the feathers on the lower abdomen; lower aspect of quills white tinged with buff barred and mottled with brown. Total length 380 mm.; culmen 25, wing 307, tail 122, tarsus 66. Collected at Casterton, Victoria, in April, 1902.

It is necessary to indicate this form by a name: otherwise the alternative, which in this case is not a good one, would be the usage of the formula

Tyto novæhollandiæ novæhollandiæ > *castanops.*

I say not a good one, as the majority of specimens show appreciable differences, whether males be compared with males, females with females, or immature with immature birds.

Tyto novæhollandiæ novæhollandiæ (Stephens).

New South Wales.
South Queensland.

This, the typical form, has been well described by North, who has also noted the sexual plumages, and thereby given the key to the variation which Rothschild and Hartert talked so much about but did not understand. In coloration this bird is lighter than the preceding and averages smaller. North questions this, but all the material, as well as workers, confirm it.

Tyto novæhollandiæ whitei Mathews.

South Australia.

South Australian birds do not agree with the preceding, and are best referred to by name. I have compared this form with *mackayi*, the Mid-Queensland bird, with which Rothschild and Hartert would unite it. That is an impossible solution and it is a surprising one to be put forward by scientific students of geographical subspecies. I admit, considering Gould's experience, that a longer series is necessary to fully define the subspecies, but it is worthy of note that North has recorded a similar example from South Australia, which he compared with specimens from Port Essington. I know of no alternative to the above nomination, as geographically this race comes between *riordani* and *perplexa*, and it is not by any means intermediate between the two.

Tyto novæhollandiæ perplexa Mathews.

South-west Australia.

This form approaches the typical race but is darker; with buffy spots beneath, and it is also larger. Rothschild and Hartert questioned my judgment in separating this form because it is only darker and larger. Their conclusion to use this name for northern examples is not a good one, as I will point out. Again, North has classed a skin from King George's Sound, West Australia, as a "medium var." with very large measurements. This confirms my judgment in separating this form, which cannot be confused with Northern birds, but belongs to the southern group. I am quite unable to suggest any other method of designating these birds save as above. As far as I can conclude at the present time, the birds listed above, viz., from South Queensland, New South Wales, Victoria, Tasmania, South Australia and South-west Australia, belong to a group characterized by their larger size and more buff coloration above and below, emphasized in the immature and females, and which must be contrasted as a whole with the birds from North-west Australia, Northern Territory and North Queensland, which are smaller, the buff disappearing, and in males from some localities almost lost altogether.

These two groups can be further subdivided as above shown in the first group, and I now deal with the members of the second group: these are more closely united than those of the first, but again the differences observed should bear designations.

Tyto novæhollandiæ kimberli Mathews.

North-west Australia.
Northern Territory.

I have fully described and figured this very distinct form, concerning which Rothschild and Hartert wrote: "There was no justification for the separation," and cited their pair from the South Alligator River as showing individual variation. This pair constituted half their material: the material which enabled them to judge the variation existent in the species. One of them is an adult male, which agrees closely with my *kimberli* and is very different from anything we have already discussed. Why Rothschild and Hartert should suggest uniting this with *perplexa* and *whitei* I do not know, unless they were prejudiced by their other specimen, which is that of a female in not fully adult plumage. As they did not understand the sexual plumages they were unable to discuss the species at all. This form shows a very pale upper-surface with pale orange-buff on the upper back, varying in extent but always small, and sometimes negligible, and pure white underneath with few and disappearing spots. In addition to my own specimens, Rothschild and Hartert had the above two, and there are two from Port Essington in the British Museum. These all show the same characteristics, and further they are confirmed by North's record of a Port Essington bird, of which he wrote "there is scarcely a tinge of buff to be found," and he records it as a female. It will be observed that G. F. Hill, when he procured some of this race, recorded it as *Strix delicatula*, though he was familiar with the southern form of the present species. It is possible that a larger series would admit the determination of several subspecies.

Tyto novæhollandiæ mackayi Mathews.

Mid-Queensland.

Rothschild and Hartert conclude: "In fact *mackayi* is perfectly similar to *kimberli* and *whitei*." They do not mention their own specimen from Coomooboolaroo, one of their four original specimens, the basis on which their article is written. These birds are certainly nearest the preceding, but are slightly darker and show more spotting below, and should for the present, considering the locality, be kept distinct. They are obviously paler than the New South Wales and South Queensland form.

Tyto novæhollandiæ galei Mathews.

North Queensland.

This form I received since Rothschild and Hartert's essay. It is very like some specimens from the North-west, but there is absolutely no buff at all present and no spotting either above or below. I here fully describe it.

Adult male. General colour of the upper-parts brown, mottled and spotted with white, darker on the top of the head, hind neck, upper back, scapulars and upper wing-coverts and paler on the primary- and secondary-quills; the dark pattern sometimes assumes the form of bars or shaft-blotches which is exemplified more especially on the scapulars, bastard-wing, primary-coverts, primary- and secondary-quills and tail, the outer tail-feathers for the most part white with the dark pattern restricted to the shafts; facial disc white with pale buff and minute dark triangular markings to the feathers on the outer margin; eyelids and a spot in front of the eye pale rust-colour, the feathers surrounding the base of the bill disintegrated and bristly in texture; entire under-surface silky-white, with dark minute subapical spots to the feathers on the sides of the breast, sides of the abdomen, under wing-coverts and under tail-coverts; lower aspect of quills white, marked and mottled with brown towards the tips. Total length 380 mm.; culmen 25, wing 280, tail 115, tarsus 63. Collected on the Pascoe River, North Queensland, on the 16th of July, 1913.

A very similar bird has been described by Rothschild and Hartert thus: "The other curious specimen is an adult male from Cape York, collected by Mr. A. S. Meek on August 4, 1898. The upper-surface is entirely black and white, without any yellowish or rufous colour, the under-side pure silky-white with only very few tiny blackish spots. Wing 286 mm. This is most likely a new race, but we do not venture to separate it on the evidence of one single bird."

It will now be seen that North-west Australia, Northern Territory and North Queensland birds are very closely related to each other and are very different from the southern races. The above nomination seems most suitable, as there are observed differences, and lumping does not produce accurate work. In the present case Rothschild and Hartert, the most pronounced advocates of subspecies splitting, attempted a reverse policy and have made more blunders than corrections.

The last form is

Tyto novæhollandiæ melvillensis Mathews.

Melville Island.

This can be distinguished as a valid race, as the birds show a phase altogether missing from the whole of Northern Australia. The small size is noticeable, and even if this were not confirmed the dark coloration is peculiar. Rothschild and Hartert's observations are in this case hopelessly inadequate and they do not seem convinced what should be done with this bird. I have fully described and figured this subspecies and now leave the matter for the student of the future.

Order STRIGIFORMES *Family TYTONIDÆ.*

No. 322.

TYTO LONGIMEMBRIS.

GRASS-OWL.

(Plate 273.)*

Strix longimembris Jerdon, Madras Journ. Lit. Sci., Vol. X., p. 86, 1839; Neilgherries, India.

Strix walleri Diggles, Ornith. Austr., pt. vii., 1866: Brisbane, Queensland.

Strix walleri Diggles, Ornith. Austr., pt. vii., 1866.

Strix candida Gould, Birds Austr. Suppl., pl. 1, 1869; Sharpe, Cat. Birds Brit. Mus., Vol. II., p. 308, 1875; Ramsay, Ibis 1875, p. 512 (N.S.W.); *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 178, 1878; *id.*, *ib.*, Ser. II., Vol. I., p. 1142, 1887 (Q.); *id.*, Tab. List Austr. Birds, p. 2, 1888; *id.*, Cat. Austr. Striges, p. 7, 1890; North, Austr. Mus. Cat., no. 12, p. 24, 1890; *id.*, Rec. Austr. Mus., Vol. II., p. 13, 1892; *id.*, Austr. Mus. Cat., no. 4, pt. 2, p. 7, 1898; Hall, Key Birds Austr., p. 7, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 53, 1901; Berney, Emu, Vol. V., p. 19, 1905 (Q.); Mathews, Handl. Birds Austral., p. 44, 1908; North, Austr. Mus. Spec. Cat., no. 1, Vol. III., p. 317, 1912.

Tyto longimembris walleri Mathews, Nov. Zool., Vol. XVIII., p. 258, 1912; *id.*, List Birds Austr., p. 117, 1913; Howe, Emu, Vol. XV., p. 72, 1915 (Vict.).

Tyto longimembris georgiæ Mathews, Austral Avian Record, Vol. I., p. 75, 1912: Victoria River, Northern Territory.

Tyto longimembris Mathews, List Birds Austr., p. 117, 1913.

Tyto longimembris longimembris Mathews, *ib.*

Distribution. Northern Territory; Queensland; New South Wales; Victoria.

Adult female. General colour of the upper-surface dusky-brown, with white or buffy-white spots to the feathers of the head, back, scapulars and upper wing-coverts, and white or buffy-white mottlings on the scapulars and wings, varied generally with orange-buff, this colour occupying the sub-basal portion of the feathers, the white spots are small and rounded on the head and hind-neck, larger on the scapulars and more lanceolate in form on the wings; lesser upper wing-coverts along the margin of the wing orange-buff, with triangular dark brown spots; bastard-wing and primary-coverts orange-buff with brown tips and elongated white marks at the tips of the feathers; primary- and secondary-quills similar, but the buff portion paler and the white marks absent, the brown pattern broken up into

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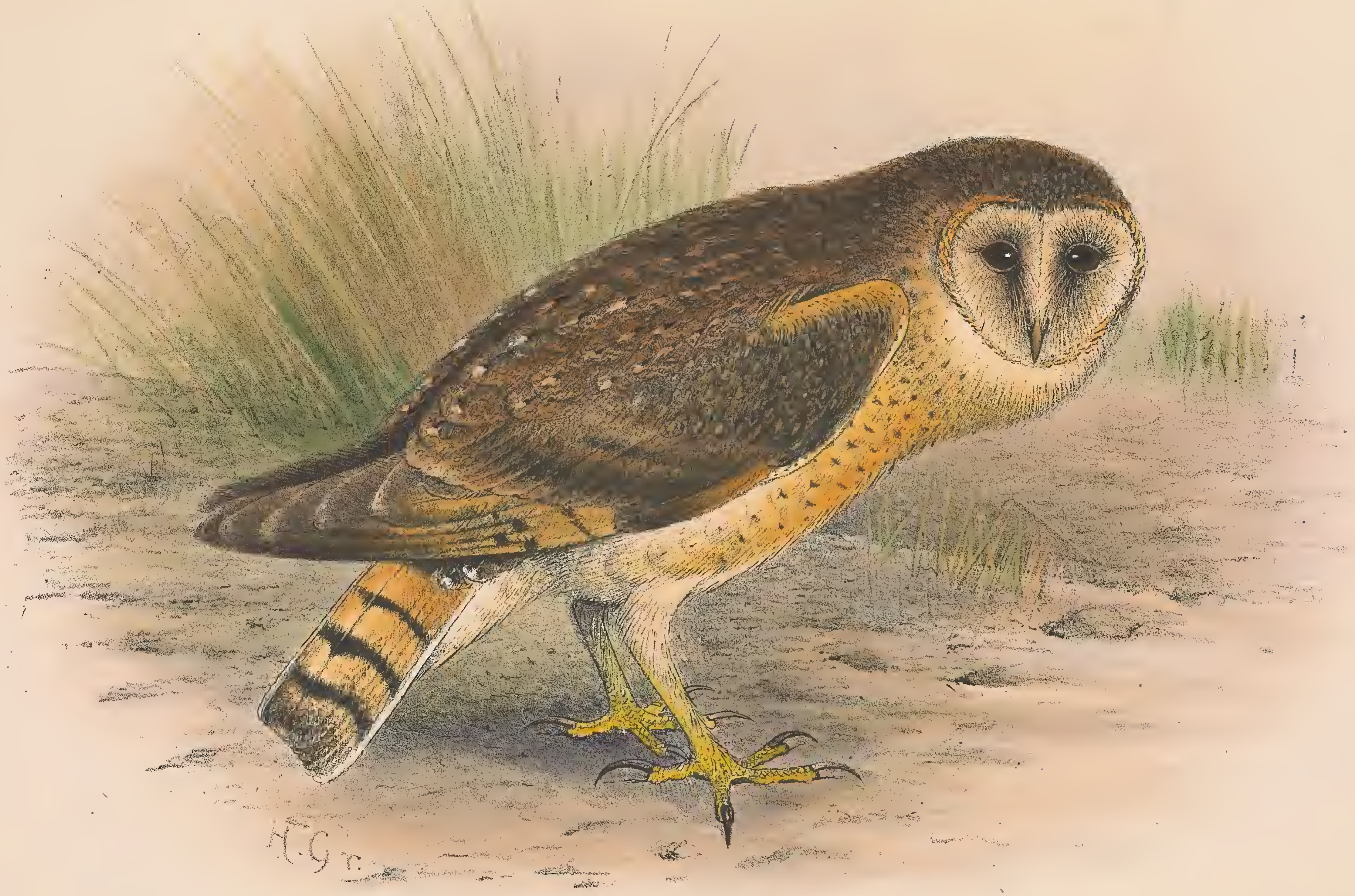
* The Plate is lettered *Tyto walleri*.



H. Grönvold, del.

Witherby & C^o.

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TYTO WALLERI.

(AUSTRALIAN GRASS OWL).

irregular bars and mottlings, the inner webs have a good deal of white near the base and pale mottlings at the tips of the secondaries and inner primaries; tail orange-buff with three dark brown bars and brown mottlings at the tips of the feathers: the outermost pair of feathers are almost entirely white, with indications of two dark bars on each and a little brown mottling near the tips, all the tail-feathers are more or less white at the tips and also on inner webs of the lateral ones, there is also an indication of a fourth brown bar on the middle tail-feathers near the base; facial disc white tinged with buff, eyelids and a spot in front of the eye blackish-brown, outer margin of facial disc buff at the tips of the feathers, with blackish dots and dark narrow edgings; sides of neck and sides of breast sandy-buff, with dark subapical spots to the feathers; abdomen, thighs, under tail-coverts, axillaries, and under-wing white with dark subapical spots and tinged with sandy-rufous, the greater series of the under wing-coverts more coarsely marked with brown; lower aspect of quills buffy-white coarsely marked with brown and becoming uniform brown at the tips of the outer primaries; tail-feathers buffy-white below, barred with brown. Bill yellowish; eyes bluish-black; feet whity-brown. Total length 370 mm.; culmen 22, wing 330, tail 112, tarsus 78. Figured. Collected on the Victoria River, Northern Territory, on the 6th of April, 1895.

An adult male from Palm Island, Queensland, is much lighter generally, especially on the under-surface. Culmen 24, wing 315, tarsus 80. Collected on the 22nd of June, 1885.

Nest. A hollow under a tuft of grass.

Eggs. Clutch four, white and roundish, 43-45 mm. by 31-32.

Breeding-season. May, June.

THAT this beautiful Owl was an inhabitant of Australia is the chief discovery of Sylvester Diggles, who figured it in his "Ornithology of Australia" as a new species, naming it *Strix walleri* and writing: "This fine new species of Owl is now figured for the first time, and it is with much pleasure I name it after the discoverer, Mr. Eli Waller, of Brisbane, to whose large and valuable collection I am so much indebted for most of my figures, and to whose scientific and extensive practical knowledge of the birds of Australia, and energy and perseverance as a collector, I am happy to bear testimony. It does not often happen in a country so well searched as Australia, since the visit of Mr. Gould in the years 1838-40, that so important and interesting a species as the present is brought to light; and the fact of this new species having been shot in the immediate neighbourhood of Brisbane may serve to encourage others interested in the study of ornithology (more especially in the newly settled districts where novelties are mostly to be looked for), to endeavour to add their contributions to the very numerous and interesting fauna of their adopted country. . . . Nothing is yet known of the habits of this species, but it doubtless assimilates in every important respect to the family in general. Its nearest ally is *Strix delicatulus*, a much smaller species, which, like the present, has the tarsi naked for about half the length, the remainder of the Australian Owls yet known being feathered to the toes."

Practically speaking, little has since been added to our knowledge of this species, and I quote the following from the *Austr. Mus. Spec. Cat.*, No. 1, Vol. III.: "Mr. G. A. Keartland noted: 'The Grass Owl is very rare near Melbourne, but occasionally these birds may be disturbed from the grass tussocks near Beveridge. Several years ago great numbers of mice overran the Wallan District, and the Grass Owl suddenly became common and many were caught in the rabbit traps, but as soon as the mice disappeared the Owls went too.' Mr. J. A. Boyd, of Ripple Creek, Herbert River, N.E. Queensland, wrote: 'This Owl nests on the ground, choosing a high thick tussock of grass, forming a bower in it, and laying its eggs on the few grass blades that have been trampled down. On the 1st June, 1884, I found two nests, each of which contained three young ones and one egg. It is a curious fact that though this bird always lays four eggs, I never found more than three young ones, one egg being always addled. A friend of mine here has also had the same experience. It seems strange that the bird should lay one egg more than she is able to hatch. When first I came these Owls were comparatively common, but latterly they have almost disappeared from this immediate neighbourhood, owing I think to the largely increased number of cattle running over the plain.'"

The systematic history of this species is almost as brief as its life-history. Gould recognised Diggle's figure as that of the Grass Owl and therefore figured it under the name of *Strix candida* in his Supplement. This was the name Tickell had proposed for the Indian Grass Owl, with which the Australian bird was considered identical. The name was continued by every writer, Sharpe, Hartert, etc., until I discarded it in 1912 and catalogued the Australian bird as *Tyto longimembris walleri*. Tickell's name of *Strix candida* was anticipated by Latham (*Index Orn. Suppl.* II., p. xiv., 1801) and consequently was invalid, and Jerdon's synonym *Strix longimembris*, also given to the India bird, came into use.

I separated the Northern Territory bird as a distinct subspecies on account of its buff under-surface, but I have noted that North observed: "Throughout Eastern Australia it is sparingly distributed, and is essentially an inhabitant of the coastal scrubs and adjacent open grass-lands, and is by far the rarest member of the genus *Strix* inhabiting the island continent. Some specimens have the upper and under-surface and ruff more strongly washed with orange-buff, and the white facial disc stained with dull chestnut."

As North only knew it from "Queensland, New South Wales and Victoria," it follows that variation is existent in these colonies. I am therefore suppressing my name for the present, as the material is not sufficient to determine how much local variation there is. It will be noted that North includes Victoria in the range of this species. I omitted it and F. E. Howe has added it again. I note, however, that Keartland records it as occurring there on one occasion. I make this comment as I described a strange Owl from Victoria as *Tyto longimembris dombraini,* which has since proved to be a peculiar phase of *Tyto novæhollandiæ,* as already pointed out.

As not standing alone in thus confusing these two species, I might record the existence in the British Museum collection of a specimen labelled "*Strix novæhollandiæ* N(ew) C(aledonia)," which is the present species.

GENUS—MEGASTRIX.

MEGASTRIX Kaup, Isis 1848, col. 770 .. .. .. Type *M. tenebricosa.*

LARGE Tytonine (?) Owls, with long bills, pronounced facial discs, long wings, medium tails and powerful legs and feet.

I have queried the association of the birds of this genus with the Tytonine forms, though other workers generally have included them in the genus *Strix* (= *Tyto*).

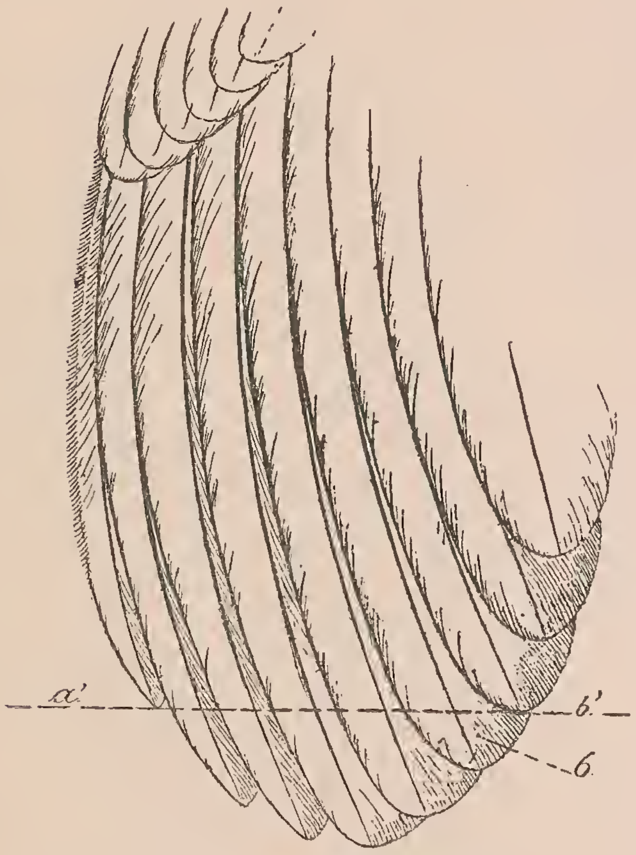
The bill is longer than in *Tyto*, but similar in constitution superficially as regards the nostrils and cere: the facial disc is also pronounced and therefore resembles the preceding.

The wings are *entirely different*, and the most casual examination would have suggested the separation of these birds from the preceding. While the tip of the wing in *Tyto* is formed by feathers 1, 2, 3, second longest and first equal to third or scarcely less, in the present genus the fourth is longest, the first shorter than the second, third, fifth and sixth and little longer than the seventh: the second is slightly longer than the sixth, while it is much longer than the first, though shorter than the third, which is about equal to the fifth. It is somewhat obvious, then, that the workers who have associated a form like this with the preceding have been careless, to say the least of it. The figures here given will fully explain this.

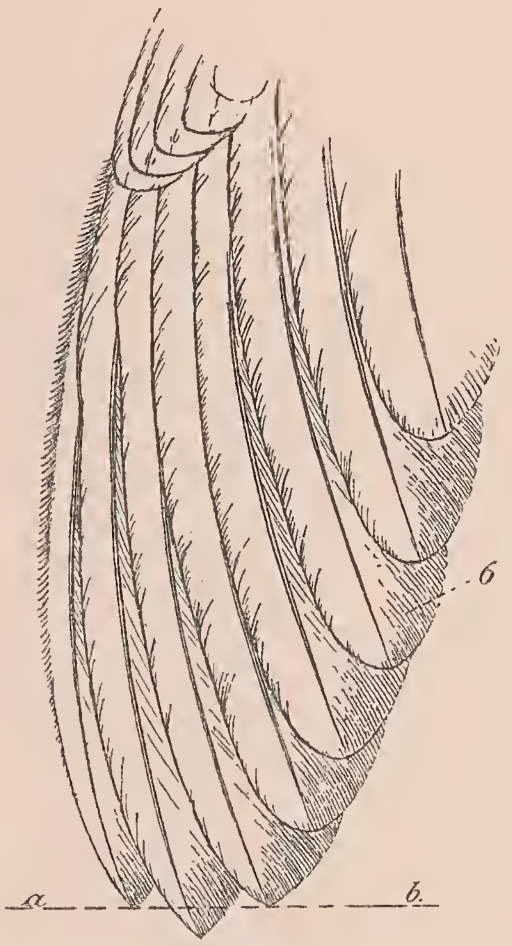
The tail is square and just about half the length of the wing.

The tarsus is short and stout, completely but scantily feathered, and about half the length of the tail; the toes are stout and long, more than half the tarsal length, and are coarsely reticulated, the reticulations bearing each a very short hair-like feather, only down the front, the sides being naked. The inner toe is equal in length to the middle one, while neither much exceeds the outer. The middle claw is sometimes serrate, often obscurely so, and the serrations are quite absent in other cases.

The coloration of this genus is distinctive and I now query its relationship with the "Barn Owls." The fact that the peculiar wing formation has been overlooked by the writers who have considered it a Barn Owl does not prejudice me in favour of the accuracy of their other conclusions. The serrations on the middle claw do not seem of much genetic value, so that we are compelled to fall back upon the facial disc, a feature which has been recognised as of little value. It will be interesting to learn the pterylosis of this form and also the osteological features, as I imagine that the knowledge of these would lead to the rejection of this genus from the family Tytonidæ.



MEGASTRIX.



TYTO.

No. 323.

MEGASTRIX TENEBRICOSA.

SOOTY OWL.

(Plate 274.)*

Strix tenebricosus Gould, Proc. Zool. Soc. (Lond.) 1845, p. 80: Clarence River, New South Wales.

Strix tenebricosus† Gould, Proc. Zool. Soc. (Lond.) 1845, p. 80; *id.*, Birds Austr., Vol. I., pl. 30, 1848; Bonaparte, Consp. Gen. Av., Vol. I., p. 54, 1850; Gould, Handb. Birds Austr., Vol. I., p. 65, 1865; Müller, Proc. Zool. Soc. (Lond.) 1869, p. 279; Sharpe, Cat. Birds Brit. Mus., Vol. II., p. 306, 1875; *id.*, Proc. Zool. Soc. (Lond.) 1875, p. 339 (Q.); *id.*, Ornith. Miscell. (Rowley), Vol. II., p. 18, 1876; Ramsay, Proc. Zool. Soc. (Lond.) 1875, p. 580 (Q.); *id.*, Proc. Linn. Soc. N.S.W., Vol. II., p. 178, 1878; *id.*, Tab. List Austr. Birds, p. 2, 1888; *id.*, Cat. Austr. Striges, p. 5, 1890; Broadbent, Proc. Roy. Soc. Queensl., Vol. V., p. 16, 1889; North, Austr. Mus. Cat., no. 4, pt. II., p. 5, 1898; Hall, Key Birds Austr., p. 7, 1899; Campbell, Nests and Eggs Austr. Birds, Vol. I., p. 52, 1901; Mathews, Handl. Birds Austral., p. 44, 1908; Jackson, Emu, Vol. VIII., p. 276, 1909 (N.Q.); Broadbent, *ib.*, Vol. X., p. 233, 1910 (N.Q.); H. L. White, *ib.*, Vol. XV., p. 60, 1915.

Strix megaera Bonaparte, Consp. Gen. Av., Vol. I., p. 54, 1850: *nomen nudum.*

Tyto tenebricosa tenebricosa Mathews, Nov. Zool., Vol. XVIII., p. 257, 1912; Rothschild and Hartert, Nov. Zool., Vol. XX., p. 283, 1913.

Tyto tenebricosa multipunctata Mathews, Nov. Zool., Vol. XVIII., p. 257, 1912: Johnston River, North Queensland; Rothschild and Hartert, Nov. Zool., Vol. XX., p. 283, 1913.

Tyto tenebricosa magna Mathews, Nov. Zool., Vol. XVIII., p. 258, 1912: Victoria; Rothschild and Hartert, Nov. Zool., Vol. XX., p. 283, 1913.

Megastrix tenebricosa Mathews, List Birds Austr., p. 118, 1913.

Megastrix tenebricosa tenebricosa Mathews, *ib.*

Megastrix tenebricosa multipunctata Mathews, *ib.*

Megastrix tenebricosa magna Mathews, Austral Av. Rec., Vol. II., p. 134, 1915.

Distribution. Queensland; New South Wales; Victoria.

Adult female. Entire upper-surface dark brown with dusky-grey bases and white spots at the tips of the feathers, many of the feathers have also whitish frecklings; the quills

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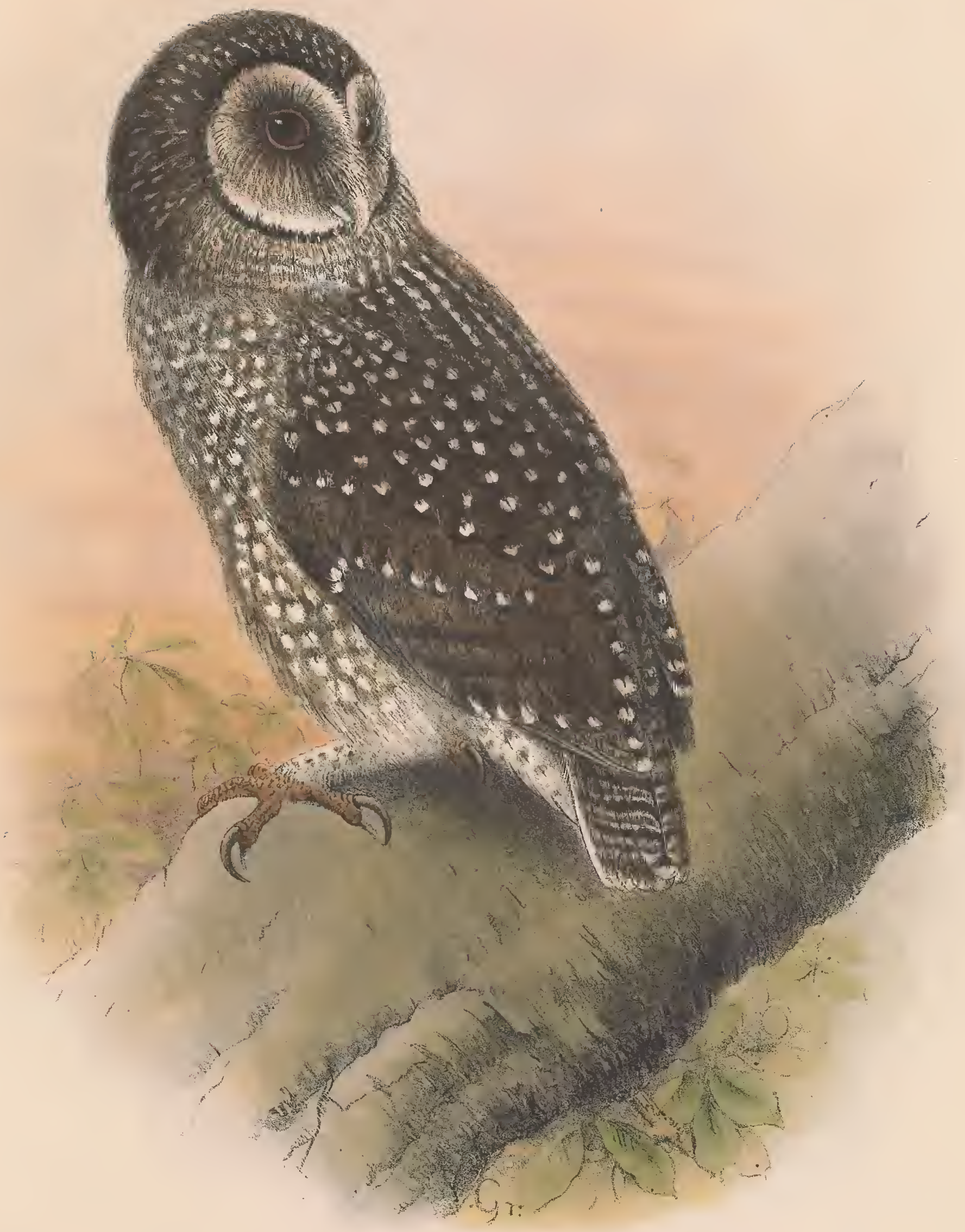
* The Plate is lettered *Megastrix multipunctata*.

† Generally correctly written *tenebricosa*.



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MEGASTRIX MULTIPUNCTATA

(NORTHERN SOOTY OWL).

somewhat paler than the back, especially at the tips of the secondaries and tips of the tail-feathers; inner webs of the secondary-quills white towards the base; facial disc pale dusky brown, blackish in front of the eye, the outer margin white with blackish tips to the feathers, the feathers surrounding the base of the bill disintegrated and bristly in texture and having extended hair-like tips; the feathers on the lower cheeks somewhat paler than the upper part of the face; the feathers of the chin white edged with blackish; under-surface paler than the back and much more profusely mottled and spotted with white; the bases of the feathers inclining to whitish on the abdomen, flanks, thighs and under tail-coverts; under wing-coverts dark brown but no conspicuous white spots; lower aspect of quills pale brown; tail below ash-brown. Total length 510 mm.; culmen 32, wing 343, tail 152, tarsus 73. Collected in Victoria in December, 1892, as is the type of *Tyto tenebricosa magna* Mathews.

Male. Upper-surface blackish-brown freckled and spotted with white, and grey bases to the feathers; lesser upper wing-coverts and primary-coverts almost uniform blackish with a spot of white at the tips of the feathers; the pale and white markings on the flight quills and tail-feathers assume the form of irregular cross-bars, the white increasing on the inner webs and tips of the feathers; facial disc white with the inner circle blackish at the base and smoky-brown at the tips, which are disintegrated and hair-like, the outer circle white, the feathers mottled and tipped with brown: the outer circle on the hinder-face appears to be followed by a line of brown feathers minutely spotted with white; the feathers on the fore-neck and breast have white tips and greyish-white bases; abdomen, sides of body, under wing-coverts, under tail-coverts, thighs and tarsi white marked with brown on the apical portion of the feathers. Bill whitish horn, sides of upper mandible slate; eyes brown; feet brown. Total length 410 mm.; culmen 28, wing 267, tail 120, tarsus 63. Figured. Collected on the Johnstone River, North Queensland, on the 9th of July, 1900, and is the type of *Tyto tenebricosa multipunctata.*

Nest. A hollow in a tree.

Eggs. Clutch, three, white and roundish, 45-46 mm. by 40-41.

Breeding-season. October, November, December.

Nothing whatever is known of the life-history of this bird. I have not found a singe record of its habits. Its systematic history is little better understood, as the following notes will show.

In my "Reference List" I admitted three subspecies. Rothschild and Hartert criticised this separation as follows:

"*Tyto tenebricosa tenebricosa*

has been restricted to New South Wales by Mr. Mathews.

"*Tyto tenebricosa multipunctata* Mathews

Nov. Zool., XIX., p. 255 (January 1912—North Queensland, type locality: Johnston River).

(As a matter of fact this name appeared on p. *257* of Vol. XVIII.)

"Diagnosis: 'Differs from *T. t. tenebricosa* in its smaller size, and more spotting above and below. Wing 263 mm.: typ. w. 290 mm.'

"This is, judging from the material available—*i.e.* the type in Mr. Mathews' collection and two males from Cedar Bay in North Queensland—collected by Mr. A. S. Meek, in the Tring Museum, an excellent new form.

We measure the type with a wing of 265, and our two males from Cedar Bay with wings of 240 and 242 mm. We believe, however, that the type is wrongly sexed, being a female, not a male. The upper-side is ornamented with much *larger* white spots, and more distinctly mottled with whitish.

"*Tyto tenebricosa magna* Mathews

Nov. Zool., XIX., p. 258 (January 1912—'Victoria').

"Diagnosis: 'Differs from *T. t. tenebricosa* in its larger size, darker coloration, and less spotting. Wing 343 mm.: typ. w. 290.'

"We are sorry to say that Mr. Mathews has described the female as a new subspecies from comparison with males. Had he cast one glance at our series of *Tyto tenebricosa arfaki* from British New Guinea, or looked up statements of writers on Australian birds, he would have found that the sexes differ enormously in size in these birds. In our *T. t. arfaki*, for example, we find males with wings of 255, and females from the same place with wings of 300 mm. Moreover, the statement that the type of *Tyto tenebricosa magna* is darker and less spotted is incorrect, as far as the specimens before us are concerned. It is thus clear that *magna* is a sure synonym of *tenebricosa*, and we can at present only admit:

"*Tyto tenebricosa tenebricosa*: Australia (New South Wales).
"*Tyto tenebricosa multipunctata*: North Queensland.
"*Tyto tenebricosa arfaki*: New Guinea."

The preceding is part of their criticism on "Australian forms of *Tyto*," which I have shown to be not blameless with regard to *Tyto novæhollandiæ*.

The present case is in even a worse state. First, they refer the species to *Tyto*, but give no reasons. I am inclined to think that even they will admit I am justified in claiming they have erred in doing so after examining the birds. Had they examined their specimens at all critically, they would have seen the great difference in wing formation and would have recognised the genus *Megastrix* even as they have the genus *Megatriorchis*.

Secondly, they admit the form *multipunctata*, but did not recognise that the whole of the three specimens were more or less immature. This would account for the small wing length, and as my type seems to be most mature, it has the longest wing, irrespective of sex. Their own series shows the difference between the adult and immature stages: these have been well described by North, but apparently North's work was not referred to by my critics. Nevertheless, the Queensland form is separable, as these more or less immature birds differ very appreciably from any similar aged birds from any other locality.

Thirdly, they note that I had compared a female with a male, hence *magna* must be suppressed. As they wrote with such confidence and such knowledge of the New Guinea bird, I believed that they were writing facts, and therefore, as I knew that I should deal with the species in a year or two, I accepted their conclusions and relegated to synonymy my *magna* when making up my "List of the Birds of Australia," p. 118.

While in Australia in 1914 I made notes on various birds I saw and examined, and as one result I noted in the *Austral Avian Record*, Vol. II., p. 134, Jan. 28, 1915: "All the examples of *Megastrix tenebricosa* I saw from Victoria were the large variety which I called *Megastrix tenebricosa magna.*"

As Rothschild and Hartert referred me to their series of *T. t. arfaki*, I requested the loan of their series, and Lord Rothschild, with his usual generosity, allowed me to criticise them. The Tring Museum does not possess a single specimen of *T. t. arfaki*, but a series of birds from a far distant locality, which is so named.

Schlegel, in the "Notes from the Leyden Museum," Vol. I., p. 1879, described *Strix tenebricosa arfaki* as: "Closely resembling the latter (*Strix tenebricosa*), it differs however by its smaller size, by the white spots of the feathers being larger and more regular orbicular, and by the light sooty-brown colour of the face, strongly inclining to white. The measures (in French measure) of the principal parts are as follows: In *S. t. arfaki*—wing 9 inches 1 line, point of wing 1 inch 10 lines, tail 4 inches 4 lines, tarse 30 lines, middle toe (without nail) 18 lines. In five specimens of *Strix tenebricosa* from Australia—wing 10⅓ to 11½ inches, point of wing 18 to 27 lines, tail 5 to 5½ inches, tarse 32 lines, middle toe 1½ to 2 inches.

"One specimen killed near Hattam (Arfak Peninsula)."

Previously Meyer had recorded (*Sitz Akad Wissensch Wien*, Vol. LXIX., pt. I., p. 396, 1874) a specimen from the Arfak Ranges, noting its small size, recording: "Wing 275: tail 130 mm."

Before criticising this, I will contrast with it Rothschild and Hartert's own idea of *S. t. arfaki*, as laid down in the *Nov. Zool.*, Vol. XIV., 1907, p. 445.

"Mr. Meek sent a series of eight specimens from the Upper Aroa River. The males agree with other males from the mountains of British New Guinea, while the females are considerably larger. *Strix arfaki* is merely a darker and somewhat larger Papuan form of the North Australian *Strix tenebricosus* Gould.

"1 ♀ Avera, Aroa R. Wing about 293 mm.

"2 ♂♂ Owgarra, Angabunga R. Wing about 255 mm.

"1 ♂ 4 ♀♀ Head of Aroa R. Wing ♂ 255, ♀ 285-305 mm.

"1 ♀ (? ♂ !) Collingwood Bay. Wing 270 mm."

It will be at once noticed that this series does not agree with Schlegel's description nor measurement. Consequently they are atypical, and as the locality is something over one thousand miles distant from the type locality, it is a legitimate conclusion that a distinct race is here met with. Further, to this anomaly Rothschild and Hartert state *arfaki* is a larger race than the Australian, and then insinuate I was wrong in describing a bird very much larger than their largest specimen. Had they been just, they would have revised their own work when they noted that the Australian bird was sometimes much larger than the New Guinea one; this they did not do, but wrote that the New Guinea race must be admitted, apparently on their previous conclusions, which they now know to be wrong. It may be argued that the New Guinea form was contrasted with their two Cedar Bay specimens, but the merest glance would have indicated that these were atypical. Such work is not useful, and I here provide a new arrangement based on the New Guinea material, as well as the Australian, which suits the *facts* better.

Megastrix tenebricosa magna Mathews.
Victoria.

Largest form, and darkest Australian one. Its measurements ♂ for ♂ and ♀ for ♀ exceed those from other localities. North's record size is also of a Victorian bird.

Megastrix tenebricosa tenebricosa (Gould).
New South Wales.

Similar to preceding, but averaging lighter and smaller.

Megastrix tenebricosa multipunctata Mathews.
North Queensland.

Based on birds not fully mature, and showing much more spotting above and below, being strikingly different when compared with similar aged birds from either south-east Australia or New Guinea.

Megastrix tenebricosa perconfusa subsp. nov.
British New Guinea.

I provide this name for the British New Guinea birds, which come close to the typical form in size and colour, but are averaging slightly larger and a shade darker.

I have given Rothschild and Hartert's measurements above. They do not agree with the description of *S. t. arfaki.*

Two specimens from the Sattelberg Mounts, East New Guinea, in the Tring Museum differ from the long series of the new form in showing a similar adult upper-surface combined with the under-surface markings of the immature of the British New Guinea (Aroa River) birds. These indicate another race and suggest that more than one race exists in New Guinea.

Megastrix tenebricosa arfaki (Schlegel).
Arfak Peninsula, New Guinea.

SOOTY OWL.

The smallest race, showing large white spottings. I do not know this race, which appears confined to the Arfak Peninsula, but the description prohibits the acceptance of the name for the New Guinea birds that live a thousand miles away. I have not seen any record from Dutch New Guinea intervening.

APPENDIX.

In the preparation of this volume a bundle of notes was overlooked. As I do not wish it to be thought that this oversight was intentional, I am printing some of them in this place. I am not transcribing all, and I wish my friends to remember that this is not on account of lack of interest, but simply that the same information has already been printed from other sources, and no good service would now be rendered by duplication. In the present notes is a series of original records prepared by Mr. J. B. White about 1875, and which have never been printed before. The birds mentioned were presented to the British Museum and reported upon by Dr. R. B. Sharpe before the most interesting and valuable notes came to hand.

Allied Harrier .. .. .. *Circus approximans, ante,* p. 24.

The following note from Miss J. A. Fletcher is interesting: "These birds often build their nests a long time before they are needed. One under observation was started on the 4th of October, 1910, and the first egg was laid on November 22nd. Several pairs of these birds (under observation), after losing their first clutch, would build a fresh nest. Should the second lot, however, be destroyed, they invariably returned to the first home and re-laid there. The birds carry quite large branches for the foundation of their nests, and one nest had a quantity of fencing wire worked in it. They are watchful lest intruders venture near the location of their home. One day I witnessed a terrific battle between a Swamp Hawk and a Crow or Raven. I judged that the Raven had been about to rob the Hawk's eggs, when she flew along and attacked him. Round and round in circles they flew, every now and then making a dash at each other. The Raven appeared to get the best of the battle and so worried the Hawk that she flew to some bent down rushes in the lagoon. Here the two birds sat and eyed one another. Then, rising again for a fresh battle, they caught sight of human life on the bank and each flew off in separate directions. Harriers often hunt in pairs, and when one bird finds a quarry too big or too fast to capture by itself it gives a long rather mournful call. The mate immediately responds. One midday, whilst sitting eating my lunch on a rising bank not far from a lagoon, I heard this call. Presently I saw the two Harriers and noticed they were intent on something in the shorter reeds. One would swoop down, then its mate did the same, the quarry evidently working towards the edge. Soon after each swoop I heard the cry of a creature in pain, and presently from out the rushes dashed a *Tribonyx.* Each Harrier took it in turn to assail her and strike her on the head. The poor bird came straight to the forest, evidently making for a patch of bracken fern. She seemed to be getting weaker, so I ran forward and scared her molesters away. They flew across to the far side of the lagoon, and the Native Hen travelled at high speed and disappeared among the bracken. I have so often noted with Native Hens that when attacked or frightened they immediately leave the shelter of the reeds and rushes and run across country. A favourite dodge is to run straight along a line of fencing."

Mr. E. J. Christian confirms this hunting habit thus: "From my observations I have come to the conclusion that many ground birds, especially Quail, are destroyed by them. I have often watched them beating up and down a field and then make a sudden dash and secure some small bird. I once watched for an hour two of the birds attacking a hare. It was blowing very hard from the north, and in turn these birds would rise and then would swoop down on their prey. Each time the hare would shift and the wind carry the bird right past. The hare would not run (as this would have given the birds the chance they wanted), but only moved two or three yards and then would sit bolt upright and wait for the next swoop. The birds tired and left the hare alone."

Red Goshawk .. .. *Erythrotriorchis radiatus, ante,* p. 87.

Mr. J. B. White's notes, written about 1875, read: "In a residence of some twelve years in the Mitchell District, Central Queensland, I never saw this bird on the open plains and downs to the west of the dividing ranges, but it is thinly scattered throughout the forest country between that range and the sea and nowhere common. I have only twice met with its nest, once on the bank of Mimosa creek, a tributary of the Dawson, in November 1870, situated at the top of an immense inaccessible gum-tree and containing one young bird about half grown: from this nest I shot the female, but left the male to rear the young bird, which he succeeded in doing. In November 1873 I found another nest also containing one young bird only, and from which I shot the female also, but did not see the male; this nest was on the banks of Spring Creek, a tributary of the Nogoa River, part of the same watershed as the other but 100 miles from it. This nest was an old one, but had been relined and repaired: it was a large flat structure of sticks, and contained only the young bird and the remains of a common white cockatoo lately killed; the young bird was covered with white down with the feathers just beginning to show. I kept this young bird until it was able to perch; it had by that time thrown out sufficient feathers to show that it puts on from the first the same plumage as the adult, only brighter, arising probably from the feathers being fresh and unworn; it was very noisy, uttering frequently a loud sharp cry, and was most voracious, but died suddenly. Its description was as follows: irides dusky; base of beak, cere and naked skin round eyes pale blue; tip of beak dark horn colour; feet and legs pale lemon yellow. Tail about half grown, greyish, barred dark brown with the tip buffy white: this is generally worn off in adults. Back, wings and breast as in the adult. The dimensions of *Urospizias radiatus* given in Vol. I. of the *Catalogue of the Birds in the British Museum*, page 160, seem to me to have been taken from a male instead of a female; the latter sex is *very much* larger than the male. I give the dimensions of the two females mentioned previously, taken before they were skinned by myself. No. 1, shot November 11th, 1870. Total length 23½ inches: breadth from tip to tip of wings 53 inches, wing 17 inches, tail 10 inches. No. 2, shot November 12th, 1873. Total length 25¼; breath 54 inches, wing closed 17¾, tail 10, tarsus 3½ inches, inside claw 2 inches round curve. A male shot November 19th, 1872, measured 20 inches in extreme length, breadth 45½, wing closed 15¼, tail 9, tarsus 3 inches. Irides brownish-yellow, cere, base of beak and bare skin round eyes bluish lead colour, tip of beak black, legs and feet lemon yellow; weight of female a little over 3 lbs. All the females I have seen differ from males in having the centre of the belly whitish, underside generally less rufous, and the central streaks broader and more marked than in the male. It seems probable that two is the utmost number of eggs laid by *U. radiatus*, as I have frequently observed that though I never found less than two eggs in the nest of *Uroaëtus audax*, I never saw more than one young bird.

"*Urospizias radiatus* seems to me to differ essentially from the true *Asturs* and *Accipiters*, which latter it resembles in its feet, in the length of its wings, which are proportionately as long as one at least true *Falco* and *Milvus*: to show this I give the comparative dimensions of females of *Urospizias*, *Falco*, *Milvus*, *Astur* and *Haliastur* taken by myself while the birds were fresh and noted at the time.

Name.	Extreme Length.	Extreme Breadth.	Wing closed to longest feather.	Tail.	Sex.
Urospizias radiatus	23½ inches	53 inches	17 inches	10 inches	Female
Milvus affinis ..	23½ ,,	52½ ,,	17 ,,	11¼ ,,	,,
Haliastur sphenurus	23½ ,,	53 ,,	17¼ ,,	10½ ,,	,,
Falco subniger ..	22½ ,,	49 ,,	16 ,,	9 ,,	,,
Astur approximans.	20½ ,,	48 ,,	12 ,,	10 ,,	,,

"*Urospizias radiatus* from the above will be seen to have little affinity with the true short-winged hawks; its flight, as far as I have seen, is like that of a Falcon, rapid, easy and direct. I have also seen it soar upwards in circles to a great height: in its style of colour, somewhat square form of tail and comparatively long wings, it seems to approach the true Kites, but unlike them in legs and feet and habits, never feeding on carrion, but principally on birds of a size the Kites never venture to attack."

WEDGE-TAILED EAGLE .. .. .. *Uroaëtus audax, ante,* p. 95.

Miss J. A. Fletcher has written me: "One of my cousins told me he saw a pair of Wedge-tailed Eagles collecting sticks for their nest. They did not select the sticks from the ground, but flew round the tree and snipped off pieces as they went past. They broke the branchlets with a jerk, which enabled the birds to retain the desired piece without it dropping to the ground."

Mr. Sandland sent me the following note in 1909: "Very common in South Australia. Took nine nests last season (1908). Three nests contained only one heavily incubated egg each, which is most unusual, and each egg was heavily marked. Eggs vary greatly in size, shape and colour. Nesting season June—October. These birds are increasing in spite of the numbers killed on various stations. In good seasons rabbits are plentiful, and in dry seasons, when stock are dying, they still have a plentiful food supply. They are looked on with great disfavour at lambing-time and are slaughtered unmercifully; during the last three years my figures are 23, 55 and 31, not including eggs or young taken from nests. In 1903 they were thicker than usual and we accounted for fully 100. Poisoned 8 at a dead sheep, 5 at a dead kangaroo, and then they were eating the dead birds and will also eat a dead crow.

"*Re* measurements from tip to tip of wings: the two largest I have measured are 6 feet 11½ inches and 7 feet 2 inches. The general average is from 5 feet 6 inches to 6 feet or an inch or two over. However, more birds will be found under rather than over six feet. I have measured fully fifty at one time and another, and every bird I shoot I can always roughly measure by putting my foot on the tip of one wing and holding the other up. I invariably do this: my height is about six feet in my boots and only an odd bird exceeds my height."

Mr. J. B. White's notes, written about 1875, are here added: "*Uroaëtus audax.* Adult female, length 40½ inches, breadth 6 feet 10½ inches, wing 26 inches; this is the largest I have measured, weight 9 lbs., nearly all black, back of head and neck rusty red. Is common on the Mitchell District and equally so below the range, but adults are more numerous in the former and immature in the latter, at least fifty to one. Since sheep have been turned loose in paddocks instead of shepherded, as formerly was universal, immense numbers of these birds have been poisoned, which from their readiness to eat carrion is easily done. By far the greater number are, however, immature birds, old black ones are in fact scarce: it still, however, is common; there is now however a reaction in favour of dingoes and eagles, as the marsupials have in a few years increased to such an extent as, in many districts, where poisoning was most vigorously carried out, to drive out the sheep and their owners. The only harm done by Wedgetails is during lambing, when they are most destructive to young lambs, killing far more than they eat, one grip across the back being enough for most lambs.

"*Uroaëtus audax* breeds in this district, and its nests are tolerably common about here: for want of large trees they use small ones. I have seen a nest in a tree only 10 feet from the ground. A bottle tree is often used: a smooth tree with a trunk the shape of a soda-water bottle, spreading above into a convenient fork; the nest is very large, made of sticks, and is used year after year, only added to and lined; eggs two, dirty white blotched with reddish brown, but I never found more than one young bird; the old birds, as far as I have seen, take quite coolly the robbing of their nests and generally clear out and sail round at a respectful distance, in spite of its name, showing very little of the pluck attributed to it.

"Though so large a bird, it can fly fast when in pursuit of anything; I have seen it descend head first from a great height with a loud rushing noise and knock over a wallaby. I have also seen two in company hunt a young calf, and young emus are easily killed, one bird striking it about the head and then the other giving it no time to recover. Bustards are very frightened of them and always keep on the look-out."

Mr. J. P. Rogers writes of the North-west Australian form: "These Eagles cause great loss of lambs on the Fitzroy. The birds gather at lambing-time and take many lambs. I have counted 40 Eagles in one paddock which contained lambing ewes: on the opposite side of the river was an unstocked paddock and in this I hardly ever saw an eagle unless it was flying over. At Mungi several of these birds were seen; dingoes had killed many sheep on Knowla Downs and these birds fed on the carcases."

Mr. E. J. Christian has forwarded the following note: "This bird adapts itself to the country it frequents. In mountainous districts, as in the North-east of Victoria and in Tasmania, it builds in impregnable places: if there are no such positions on the mountains, it builds in the highest trees. It has been known to build on the plains, by piling up tremendous heaps of dead sticks. In the Mallee, in the North-west, where the Eucalyptus grows from six to fifteen feet high, it readily builds in this low timber, but on account of the dry unoccupied country it is safe. Here I generally find them in the Yellow Box trees, which are the tallest and most inaccessible. It will also build on the sides of steep cliffs by the sea. I know of one nest on Cumberland Cliff, near Lorne.

"To the sheepholder, this bird is a nuisance, as it will attack and kill big lambs, and even dispute with the mothers for them. They also attack poultry: one day in April, 1907, I saw an eagle continually rising and swooping; on going up to the place I found about a dozen turkeys at bay, most of which had their tails pulled out and the ground was strewn with feathers. I just came in time to save them, as they were completely done up. They go after rabbits and hares as well.

"I found a nest on Boxing Day, 1905, on the steep face of Mount Barrow (4,644 ft. high), which is 19 miles S.S.E. of Launceston. The two birds were the finest I have ever seen. The same day next year, two of us went up the mountain. The female only was there: she screamed and retired about two hundred yards and then flew straight at us. We went under cover, and as she swooped, screaming, we made a great noise; each time she would turn and go straight up into the air and repeat the same performance. After a time she left us: we had scarcely descended 200 feet when the male arrived.

"Here in Victoria they are shy as a rule, but one day I was out riding and I came across two of their nests very close to each other and in each was a young bird. I halted at the first nest and the male came straight down at me and circled round, and after swooping fairly close to me flew away. I have watched them soar for miles without a flap of the wings; their progress seems to be made merely by changing the position of their bodies so as to fly at an angle, and this causes them to descend; quickly they right themselves again, and the descent is stopped and they go straight on, perhaps rising higher again."

LITTLE EAGLE .. .. *Hieraaëtus pennatus, ante*, p. 118.

Mr. J. B. White's notes, written about 1875, are here recorded: "Specimen shot on the Barcoo July 18th, 1868: length 22¼, breadth 50, wing 16, tail 8¼ inches. Whole underside rusty red, under wing-coverts the same, narrow black streaks down centre of the feathers on the breast. Specimen shot on the Nogoa, July 21st, 1871: length 22½, breadth 51½, wing 16½, tail 8½ inches, weight 3¼ lbs. Whole underside buffy white, under wing-coverts the same, some feathers on the chest tinged with rusty, forming an indistinct band extending along the line of the wing bones to the roots of the primaries or underside of wings, but deeper in colour than on the chest; thighs rusty.

"Which of these, the dark or the light breasted bird, is the adult I cannot make out. I have certainly seen 20 pale birds to one dark one and yet I have seen light coloured birds breeding, and Gould describes a dark one shot from the nest. Judging from the pale birds being most numerous, and the tendency most of the eagle tribe seem to have to get darker with age, I should suppose the dark ones to be the adult; on the wing the difference is most striking, appearing like two distinct species. *N. morphnoides* is not rare in the Mitchell District or below the range where there is open country; it is a muscular, powerful bird for its size, and lives entirely by its own exertions: its legs and thighs are very stout in proportion, and I never knew it to feed on carrion, and it is therefore never poisoned. It is generally seen in pairs and frequently utters a short sharp whistle: is shy and wary, generally builds at the top of a lofty gum if to be found, and makes the usual flat platform affair: is an active bird, a good deal on the wing and feeds on lizards and small quadrupeds; soars to a great height at times, when it frequently utters its peculiar whistle quite different from that of any other bird I am acquainted with. In the pale plumage this bird much more nearly resembles *N. pennatus* of Europe, but has never a white shoulder; the smallest specimen I have measured was 21½ in length, wing 15¾: this I took to be the male. The egg I have not yet seen, though I have met with two or three nests. The short crest is not usually visible. The head, back, wings and tail are alike in all I have met with, and the sexes differ very little in size unless I happen only to have met with females, which is hardly likely."

WHISTLING EAGLE .. .. *Haliastur sphenurus, ante,* p. 160.

Mr. J. W. Mellor has given me the following note: "Commonly known as the Whistling Eagle, on account of its peculiar and plaintive whistling note, which it utters while on the wing and also while perched on some dry tree. They love to be in the precincts of water, whether inland or coastal, as they live to a large extent on larger fish, but also are terrors to rabbits and other small animals. They do not breed near Adelaide, but out of breeding season they often come to the Reedbeds and sometimes may be seen in numbers of from 10 or 15 in a mob, being apparently young birds which have arrived after nesting season. I have taken their eggs on Lakes Albert and Alexandra and on the Coorong, South Australia, where they like to build in the she-oaks (Casuarina) at varying distances from the ground, anything between 15 to 30 feet up; the nest is somewhat bulky for the size of the bird, being composed of fairly large sticks, etc., and lined with shreds of bark and fine twigs; they lay two or three eggs, of a chalky white ground, and sparsely spotted and blotched with reddish brown on the surface. The smaller birds take a delight to build their nests in the woodwork of these eagles' nests, and they seem to dwell together in peace and safety. I noticed in the sticks of a nest on the shores of Lake Albert in a she-oak tree that the yellow-rumped tit had built its nest, and also a chestnut-eared finch, while in the same tree near by a pied *Grallina*, or Murray magpie, and a shepherd's companion (*Sauloprocta motacilloides*) had built their nests and were rearing their young in safety under the 'wing' of the whistling eagle. These birds do not seem to be harmful to the settlers."

Mr. J. P. Rogers has written me: "In North-west Australia these birds remain all the year and are fairly numerous. Usually a few are to be seen round every camp, and at homesteads are often in considerable numbers and associate freely with *Milvus affinis*. At Marngle Creek the stockmen killed a beast near my camp and many gathered in a few days to feed on the offal and bones."

ALLIED KITE .. .. *Milvus migrans*, *ante*, p. 171.

Mr. J. P. Rogers' notes from North-west Australia read: "In March 1902 at Snake Creek, while travelling, the Kites were following me in considerable numbers: they were catching the large yellow-winged grasshopper which rose in front of my horses in great numbers. The birds are very clever at catching the hoppers on the wing. They seize their prey with one foot, then tear the wings off with their beak and swallow the insect in one or two mouthfuls. They feed on the wing.

"These birds are very numerous here in the cold season and are evenly distributed over most of the district: they usually arrive in numbers in April, leaving again in October, but near slaughter-houses and around station homesteads where offal is plentiful, a few remain the whole year. In 1903, 1904 and 1905 there were many Kangaroo hunters (there were 80 men hunting at one time, and some shot as many as 170 animals in a day, but 50 would be an average day: there were about 30 regular hunters, others would shoot for a few weeks while waiting for work or to see if they could do at the hunting) busy on the Fitzroy, hunting the Agile Wallaby. This animal was in tens of thousands, and the pastoralists had to take steps to have them destroyed, and to that end paid so much per scalp. The hunters used to shoot all large and small, only skinning the former. The immense amount of offal caused these birds to remain in great numbers all the year. These Kites apparently preferred fresh meat, as when a hunter went out in the morning, he would have a following of Kites which would accompany him until some animals were shot and skinned. Sometimes while skinning a wallaby I have seen 30 to 40 Kites perched all around some within 10 yards awaiting for a meal, and this at a place where there were scores of carcases in all stages, from fresh to putrid, so apparently they prefer freshly-killed meat: perhaps it is the blood that draws them. At Marngle Creek a few of these birds came to feed on the offal of a beast that was killed, and at Mungi only one Kite was seen."

BLACK-BREASTED BUZZARD .. .. *Gypoictinia melanosterna, ante,* p. 188.

Mr. J. B. White's notes, written about 1875, are of great value: "Though I have seen this bird near the coast, it seems more numerous in the Mitchell District in Queensland than elsewhere, though nowhere common, and from its excessive shyness the most difficult to procure of any of the Australian Raptores. From its carrion-feeding propensities, however, a great number have of late years, since the wholesale system of laying out poison for native dogs was introduced, been destroyed, and in the sheep districts it is fast becoming extinct. This bird is almost constantly on the wing, soaring slowly round with the wings turned upwards at an angle with the body, much like the Wedge-tailed Eagle, and is often mistaken for that bird; its food seems to consist of lizards, small quadrupeds and any dead animal it can find; during the lambing-season it frequents the lambing ground for the sake of any dead lambs it can pick up, but never as far as I have seen attacks them while alive, and consequently does no harm. Even when attracted by food it shows the same caution as at other times: at a person's approach it circles round, each circle getting further off, and if followed moves off altogether. This shyness seems natural to it, as it displays the same caution in country only just occupied by whites and where it could have had no experience of firearms. The nest is a large flat mass of sticks like that of the Wedge-tailed Eagle, but not so large, generally in the fork of a tree on the banks of a creek or in the neighbourhood of a scrub. One I examined on the Barcoo contained one young bird covered with white down, through which the feathers were beginning to show, brown with bright rufous edges, both above and below, giving it a striated appearance; this was unluckily killed; the irides were dark, the base of the beak pale blue, feet and legs bluish.

"Adult, length 24 inches, breadth 61 inches, wing closed 19½ inches, tail 8 inches, weight 3¼ lbs.

"Full grown bird of the year 24, wing 19, tail 8¾ inches; chin and throat rufous, streaked downwards with dusky on centre of feathers; breast and belly rufous or reddish orange, broadly streaked down centre of feathers with black; under tail-coverts, sides and thighs plain rufous tinged with chestnut; small feathers from base of quills to the elbow of wing on underside white, streaked black; back of the head rufous chestnut streaked with black; back, tail and wings as in the adult, but the white at the base of the primary quills much less extensive. This bird haunted a lambing-place for some time in company with two others both with black breasts, and from their difference in size evidently male and female; it was much less shy than the adults and was ultimately poisoned, but unfortunately was not found until too late to be preserved. The description given above I took from the bird; on the wing it had a very different appearance from the adults, looking less black and not showing so much white in the primaries, so much so that I first mistook it for a specimen of *Milvus isurus*, which has a very similar flight and also has a white patch at the base of the primaries, and I could not make out its being in company with *G. melanosterna.*

"The closed wings in the Black-breasted Buzzard exceed the tail by fully an inch. I think the dimensions I have given are taken from males, as I have an adult skin with a wing 20½ inches from elbow to tip of longest feather and generally larger than the above, which are measured while fresh. The black breast is not assumed until the second year probably. I have only seen black-breasted birds breeding."

Mr. J. P. Rogers, regarding North-west Australia, observed: "At Marngle Creek this species was fairly numerous, but none were seen in full plumage.

"At Mungi only one immature bird was seen. I have very seldom seen an adult plumaged bird of this species. When at Point Torment, King Sound, I often saw these birds; some writers say this bird is of the interior, but this does not apply to Kimberley."

GREY FALCON .. .. *Falco hypoleucus, ante,* p. 234.

Mr. J. B. White wrote about 1875 regarding this bird: "In ten years I have only seen about a dozen of these birds, three of which I shot, one adult female and adult male, but with a few brown youthful feathers left, and one young male. I have never seen it on the coast, and it is I consider by far the most scarce of the Australian Falcons.

"*Adult female.* Length 17, breadth 39, wing 13½, tail 6 inches. Ground colour all over, above and below, clear blue-grey; tail the same but darker barred with dark brown, black shafts to the feathers on back and breast. *Male.* Length 15, breadth 34, wing 11½, tail 5½ inches; same plumage as female, but most of the tail-feathers greyish-brown and much worn, some new tail feathers grey as in female. These were in company and shot November 15th, 1872, on the River Nogoa. Base of beak, cere and orbits yellow; feet and legs orange yellow. Young male shot May 4th, 1872: greyish brown above, white on breast and belly, a narrow streak of blackish-brown down each feather, a few new grey feathers beginning to show on back and wings; irides dark, beak cere, legs and feet as in adult.

"This is a heavy compact bird, not very shy and usually met with in pairs; is most numerous on the western side of the range. I have seen it on the Thompson and Barcoo rivers; it seems to prefer open plains; its flight is very easy and rapid. I have little doubt it breeds in the Mitchell District, but of its habits generally I know nothing."

BLACK FALCON .. .. *Notofalco subniger, ante,* p. 253.

I here give Mr. J. B. White's notes written about 1875: "Is a common bird on the open plains in the Mitchell District generally and found all the year; it is easily shot from its boldness and habit of attending, generally in pairs, anyone riding across the plains, hovering overhead and swooping down on any quail or large grasshoppers that may be raised out of the long grass, descending on them with great force and a loud rushing noise; the force of the descent is usually sufficient to take the bird up again to its original height, when it circles round, and holding the grasshopper in its feet, picks off the legs and wings and devours the rest. I have seen quail served in the same way. When driving sheep or cattle I have often seen two or three pairs thus engaged and keeping up with them for miles, and I have been led to lost sheep by observing this bird hovering over them. When the Harlequin Bronze-wing or flock pigeon, as it is called here, is breeding, great numbers of young are killed by these birds, but they never seem to attempt to catch anything on the ground, only on the wing, and quail escape by dropping into the long grass.

"The male of this bird is smaller and darker than the female. I never saw this bird with a yellow cere, always bluish lead colour, same as base of beak: legs and feet also bluish. Though this bird must breed in the district I never yet met with its nest or eggs.

"Though *F. subniger* is a large bird, I never knew it to attack birds of any size, and it is less compact and heavy for its size than *F. hypoleucus*, longer in the tail in proportion than either that bird or *F. melanogenys*, and is I think comparatively less powerful and rather shorter in the wings. A fine adult female measured in extreme length 22½, breadth 49½, wing from carpus 16½, tail 9½, tarsus 2½ inches, weight 2 lbs."

BROWN HAWK .. .. *Ieracidea berigora, ante,* p. 260.

Mr. J. P. Rogers, one of the keenest bird-observers Australia has produced, has written me from North-west Australia: "*Hieracidea orientalis.* I am always a bit in doubt about this species and *H. berigora.* There are always many birds which I am in doubt as to which species they belong. Both species are numerous here. The easiest way to collect these birds is to light a grass fire, preferably spinifex, which burns very fiercely and sends up dense clouds of black smoke. The hawks come for the grasshoppers, etc., driven out by the fire, and search the burnt ground afterwards for any lizards, snakes, etc., that may have been killed. *Milvus affinis* and *H. sphenurus* also come freely to fire. At Marngle Creek a few were seen every day, and at Mungi Rock hole from the 20th of June to the 4th July I saw a few every day, but were not nearly so numerous as *H. berigora.* These birds remain the whole year in West Kimberley.

"*Hieracidea berigora.* This species appears to be the commonest bird at Mungi, but I am never sure of its identity even after shooting the bird, the other species is so much like it at times."

Captain S. A. White, the "explorer ornithologist," also remarks: "*Ieracidea berigora.* This is a most perplexing bird, for there are two or three distinct color phases in South Australia. They are a common bird in the interior, when the bird takes on a very ruddy hue, and seems to nest over a long period. Their cry is very harsh: food consists of insects and reptiles.

"*Ieracidea b. occidentalis.* A fairly common bird on the seaboard and islands off the South Australian coastline. Habits, etc., like the preceding form. A female shot on Wedge Island, 6/1/16, had iris brown, bill slaty blue, bare space round the eye bluish grey, feet bluish grey, nails black. Stomach much distended with small lizards, some whole, others in pieces."

NANKEEN KESTREL .. .. .. *Cerchneis cenchroides, ante,* p. 283.

Mr. J. B. White's observations, written about 1875, read: "Adult female shot June 9th, 1872. Length 13¾, breadth 29, tail 6¼, wing 10¼ inches; tail cinnamon red, broad black terminal bar, white tip.

"Young full grown; ground colour more of a brownish red than adults and much more spotted; breast buff and more thickly streaked than adult female; tail cinnamon-red, terminal bar not so wide as adult, tips buff, tail numerously barred with dark brown; these were three young birds fully grown but attended by the old ones; all three young were alike, most probably male and female are alike for first year.

"A common bird on the Mitchell or wherever there are open plains; breeds in hollow limbs of trees, but I once found its nest in an old nest of *Milvus affinis,* so it does not seem particular; lays 3 or 4 eggs, varying from cream colour, freckled and blotched with reddish chestnut, to uniform reddish chestnut. On the Mitchell it breeds at any time when there is rain: time of year, except in the middle of summer, seems of no consequence. Very shy and difficult to shoot, it frequently hovers after the same manner as the European Kestrel and feeds on insects, small lizards, etc. It is very noisy when its nest is approached, but keeps well out of shot."

Captain S. A. White's notes, written this year, may be contrasted: "This is a very common bird all over South Australia and does much good by destroying so many mice. It becomes very confident and tame if not molested, but sad to say the public class it as one of the hawk family and is often destroyed as being such. Its peculiar laughing call is very familiar to those living in the farming areas, where the beautiful and useful birds are to be seen hovering over the stubble or crops in a very characteristic attitude as if suspended in the air, it keeps its position so long. Met with these birds in pairs along the Gum creeks in Central Australia, where they were nesting in August, 1913, and they were also seen in 1914 in the North West (Musgrave trip)."

INDEX.

NOTE.—The cyphers in THICK TYPE refer to the page where the genus or species is systematically treated. These are placed first.

Accipiter, **73**, 6, 8, 9, 11, 16, 54, 55, 74, 224, 281.
—— *approximans*, 57.
—— *cœrulescens*, 73.
—— *cirrhocephalus*, **76**, 39, 74, 75, 164, 184.
—— —— *broomei*, 77, 81, 82.
—— —— *cirrhocephalus*, 77, 81.
—— —— *papuanus*, 81.
—— —— *quœsitandus*, 81, 82.
—— *cooperii*, 73.
—— *erythrauchen*, 75.
—— *fasciatus polycryptus*, 65, 66, 67, 71.
—— *fringillarius*, 73.
—— *korschun*, 177.
—— *melanops*, 77, 83.
—— *nisus*, 73, 75.
—— *novæhollandiæ leucosomus*, 53.
—— —— *novæhollandiæ*, 53.
—— *radiatus*, 87.
—— *rubricollis*, 75.
—— *torquatus*, 76, 78, 83.
—— (*Astur*), 86.
—— (——) *eudiabolus*, 86.
acuminata, *Heteropygia*, 257.
addenda, *Hieracoglaux connivens*, 336, 345.
——, *Ninox connivens*, 336.
Ægypius, 281.
æruginosus, *Circus*, 10, 11, 13, 26, 177.
——, *Milvus*, 177.
Æsalon, 4, 6, 221, 222.
affinis, *Hydrictinia*, 171.
——, *Milvus*, 171, 174, 175, 178, 179, 209, 256, 413, 418, 422, 423.
——, —— *korschun*, 171.
——, —— *migrans*, 180.
——, *Tyto alba*, 371.
alba, *Strix*, 363, 372.
——, *Tyto*, **365**, 360, 361, 366, 372, 386.
——, —— *alba*, 366, 371, 391.
albaria, *Ninox*, 327.
——, *Spiloglaux novæseelandiæ*, 332.
albicilla, *Haliaëtus*, 135.
albirostris, *Aquila*, 95, 98.
alboides, *Astur novæhollandiæ*, 44, 52.
albus, *Astur*, 43.
——, *Falco*, 43, 45.
alexandræ, *Tyto alba*, 366.
Allied Harrier (Swamp-Hawk), **24**, **411**.
—— Kite, **171**, **418**.
Aluco, 360, 362, 363.
—— *delicatula*, 365.
—— *flammea delicatula*, 365.
ambiguus, *Haliastur indus*, 155, 156.
Anas boschas, 243.
—— *obscura*, 243.
—— *superciliosa*, 256.
anatum, *Falco*, 243.
——, —— *peregrinus*, 248.
Antenor, 6, 8.
Anthochœra, 185.
Anthus australis, 185, 254, 256.
apivorus, *Buteo*, 13.
approximans, *Accipiter*, 57.
——, *Astur*, 47, 51, 56, 59, 60, 61, 63, 64, 65, 66, 67, 69, 71, 164, 184, 413.
——, *Circus*, **24**, 17, 26, 32, 411.
——, —— *approximans*, 32.
——, *Urospizia*, 57.
——, *Urospizias*, 57, 70.
apsleyi, *Falco frontatus*, 227.
——, —— *longipennis*, 227, 232.
——, —— *lunulatus*, 227.
apud, *Falco pondicerianus*, 153.
Aquila, 6, 7.
—— *albirostris*, 95, 98.
—— *audax*, 95, 122, 338, 357.
—— —— *audax*, 96, 112.
—— —— *carteri*, 96, 112, 115.
—— *cuneicaudata*, 95.
—— *fucosa*, 95, 338.
—— *fuscosa*, 95.
—— *morphnoides*, 118, 122.
—— —— *coongani*, 118, 123.
—— —— *morphnoides*, 118.
Aquilastur, 116.
Archibuteo, 6, 8.
arfaki, 408.
——, *Megastrix tenebricosa*, 408.
——, *Strix*, 407.
——, —— *tenebricosa*, 407, 408.
——, *Tyto tenebricosa*, 406, 407.
ashbyi, *Falco hypoleucus*, 238.
Ash-headed Falcon, 58.
ashleyi, *Falco hypoleucus*, 234.
Asio, 362.
assimilis, *Circus*, **18**, 9, 10, 11, 15, 16, 17, 20, 21, 22, 24, 25, 26, 28, 31.

assimilis, *Circus assimilis*, 19.
——, *Hieracoglaux connivens*, 348.
——, *Ninox connivens*, 347, 348.
——, —— *rufistrigata*, 348.
Astur, 5, 8, 11, 12, 13, 14, 16, 54, 74, 78, 84, 85, 86, 89, 91, 224, 281, 413.
—— *albus*, 43.
—— *approximans*, 47, 51, 56, 59, 60, 61, 63, 64, 65, 66, 67, 69, 71, 164, 184, 413.
—— —— *insularis*, 71.
—— *australis*, 64.
—— *badius*, 13.
—— *cayanensis*, 13.
—— *cinereus*, 36, 38, 39, 40, 47, 49.
—— *cirrocephalus broomei*, 77, 80.
—— —— *cirrocephalus*, 77, 80.
—— *clarus*, 36, 38, 47.
—— —— *clarus*, 36.
—— —— *cooktowni*, 36, 37.
—— —— *robustus*, 36.
—— *cruentus*, 56, 57, 62, 63, 64, 65, 67, 68, 69, 89, 90.
—— *fasciatus*, 40, 56, 60, 62, 63, 65, 66, 67.
—— —— *cruentus*, 57, 65, 66.
—— —— *didimus*, 57, 65, 66.
—— —— *fasciatus*, 57, 65, 66.
—— —— *mackayi*, 57.
—— *hyder*, 129.
—— *leucosomus*, 44, 47, 52.
—— *maculosus*, 57, 59, 71.
—— *novæhollandiæ*, 37, 38, 40, 43, 46, 47, 48, 49, 52.
—— —— *alboides*, 44, 52.
—— —— *leucosomus*, 44.
—— —— *novæhollandiæ*, 44.
—— *palumbarius*, 13.
—— *radiatus*, 56, 62, 63, 87, 90, 91.
—— —— *radiatus*, 87.
—— —— *rufotibia*, 87.
—— *raii*, 36, 37, 46.
—— *rayi*, 36, 48.
—— *sharpii*, 63, 64, 66, 67, 71, 72.
—— *testaceus*, 87.
—— *torquatus*, 63, 64, 65, 67, 71, 76.
—— —— *cruentus*, 67.
—— —— *sumbaënsis*, 67.
—— —— *torquatus*, 66, 67.
—— —— *wallacii*, 67.
Asturaëtos, 116.
Asturina, 6.
Asturinula, 5, 8.
ater, *Milvus*, 13, 173.
aterrimus, *Milvus*, 171.
Athene, 384.
—— *boobook*, 309, 324.
—— *clelandi*, 324, 384.
—— *connivens*, 335.
—— *fortis*, 335, 337, 338, 384.
—— *frontata*, 335.
—— *leucopsis*, 384.
Athene maculata, 309, 324.
—— *marmorata*, 309, 324.
—— *novæzelandiæ*, 324.
—— *ocellata*, 309, 324.
—— *rufa*, 350, 359.
—— *strenua*, 305, 307, 352, 356, 384.
audax, *Aquila*, 95, 122, 338, 357.
——, —— *audax*, 96, 112.
——, *Uraëtus*, 95.
——, *Uroaëtus*, **95**, 94, 103, 104, 105, 107, 111, 112, 135, 137, 143, 195, 413, 414, 415.
——, *Uroaetus audax*, 96.
——, *Vultur*, 95, 97.
aurifrons, *Ephthianura*, 254.
Australian Goshawk, **56**.
australis, *Anthus*, 185, 254, 256.
——, *Astur*, 64.
——, *Corone*, 288.
——, *Haliaëtus*, 148.
——, *Nisus*, 63, 70, 71.
——, *Nyroca*, 243.
Aviceda, 212, 213, 214, 215.
—— *cuculoides*, 214.
—— *subcristata*, 216.
—— *verreauxi*, 214.
Avicida, 211.
axillaris, *Elanus*, 199, 201, 202, 203, 204, 206, 271.
——, —— *axillaris*, 199.
Axillary Falcon, 200.

babylonicus, *Falco peregrinus*, 248.
badius, *Astur*, 13.
Balbusardus, 293.
bargei, *Tyto alba*, 371.
Barnardius occidentalis, 289.
—— *semitorquatus*, 320.
Baza, 6, 7, 9, 146, 211, 212, 213, 214, 215, 295.
—— *ceylonensis*, 212.
—— *cuculoides*, 211.
—— *erythrothorax*, 212.
—— *leuphotes*, 212, 213, 214.
—— *lophotes*, 212, 214.
—— *madagascariensis*, 211, 212.
—— *magnirostris*, 212.
—— *reinwardti*, 212, 214.
—— *rufa*, 212.
—— *subscristata*, 212, 214, 216, 218.
—— —— *bismarcki*, 219, 220.
—— —— *gurneyi*, 219, 220.
—— —— *megala*, 219, 220.
—— —— *pallida*, 219, 220.
—— —— *queenslandica*, 216.
—— —— *reinwardti*, 219, 220.
—— —— *rufa*, 219, 220.
—— —— *subscristata*, 216, 219.
—— —— *timorlaoënsis*, 219.
—— *sumatrensis*, 212.
—— *verreauxi*, 211.

INDEX.

berigora, Falco, 260, 262, 273, 276.
——, *Hieracidea*, 238, 258, 260, 263, 264, 265, 266, 267, 270, 271, 272, 273, 279, 280, 422.
——, *Ieracidea*, **260**, 259, 264, 269, 270, 276, 278, 279, 422.
——, —— *berigora*, 261, 274, 277, 278, 280.
Berneyornis, **305, 355**.
—— *strenuus*, **356**, 355.
—— —— *victoriæ*, 357.
Bird Hawk, 241, 251.
bismarcki, Baza subscristata, 219, 220.
Black-breasted Buzzard, **188**, **419**.
—— -cheeked Falcon, **241**.
—— -shouldered Kite, **199**.
—— Falcon, **253**, **421**.
Blagrus, 131.
—— *leucogaster*, 134.
Bold Vulture, 95.
bonelli, Falco, 117.
——, *Hieraaëtus*, 116.
Boobook Owl, **309**.
boobook, Athene, 309, 324.
——, *Jeraglaux*, 309.
——, *Ninox*, 310, 313, 314, 315, 317, 318, 320, 321, 327, 328, 332, 333.
——, —— *boobook*, 311, 321, 325, 326, 328.
——, *Noctua*, 309, 323, 324, 384.
——, *Nyctipetes*, 309.
——, *Spiloglaux*, 305, 309, 326, 331, 332.
——, —— *boobook*, 311.
——, —— *novæseelandiæ*, 308, 329, 330, 331, 332.
——, *Strix*, 309, 323.
boschas, Anas, 243.
boweri, Ninox, 328.
——, *Spiloglaux*, 309, 311, 313, 326, 331.
brookei, Falco peregrinus, 248.
broomei, Accipiter cirrocephalus, 77, 81, 82.
——, *Astur cirrocephalus*, 77, 80.
Brown Hawk, 260, 422.
Bubo, 362.
Bupernis, 127, 128.
Busarellus, 6, 8.
Butaetes, 116.
Butaëtus, 116.
—— *morphnoides*, 118.
Butastur, **127**, 6, 8, 9.
—— *indicus*, 130.
—— *liventer*, 130.
—— *teesa*, **129**, 127, 130.
Buteo, 6, 8, 12, 13, 85, 91, 190.
—— *apivorus*, 13.
—— *cinereus*, 13.
—— *connivens*, 335.
—— *cristatus*, 295, 301.
—— *melanosternon*, 188.
—— *vulgaris*, 13.
Buteogallus, 6.
Buteola, 6.
Buteopernis, 127, 128.
Buzzard, Black-breasted, **188**, **419**.
——, White-eyed, **129**.

Cacatua sanguinea, 193, 237.
cærulescens, Accipiter, 73.
cæruleus, Elanus, 197, 205, 206.
calei, Haliætus, 87, 89.
caleyi, Haliætus, 89.
calidus, Falco peregrinus, 248, 249.
candicans, Falco, 235.
——, *Hierofalco*, 222.
candida, Strix, 398, 400.
candidum, Dædalion, 43.
canorus, Haliæëtus, 90, 160, 162.
canus, Falco, 57, 58.
carteri, Aquila audax, 96, 112, 115.
——, *Uroaetus audax*, 96.
Casarca tadornoides, 165.
cassini, Falco peregrinus, 248.
castanops, Strix, 373, 377, 378, 379, 381, 382, 383, 384.
——, —— *novæhollandiæ*, 374, 380.
——, *Tyto*, 373, 388, 391, 392.
——, —— *novæhollandiæ*, 360, 374, 385, 391, 393, 394.
Catharista, 5.
cayanensis, Astur, 13.
cenchroides, Cerchneis, **283**, 287, 288, 289, 290, 422.
——, —— *cenchroides*, 284, 291.
——, *Falco*, 283.
——, *Tinnunculus*, 283.
centralia, Ieracidea berigora, **277**, 262.
Cerchneis, **281**, 4, 9, 221, 222, 223, 224, 225, 259, 264, 282.
—— *cenchroides*, **283**, 287, 288, 289, 290, 422.
—— —— *cenchroides*, 284, 291.
—— —— *milligani*, 284, 291.
—— —— *unicolor*, 284, 291.
—— *immaculata*, 283.
—— *naumanni*, 281.
—— *rupicola*, 281.
—— *sparverius*, 281.
—— *tinnunculus*, 281.
—— —— *unicolor*, 283, 284, 289, 290, 291.
ceylonensis, Baza, 212.
chalcoptera, Phaps, 319.
Chicquera, 6, 222.
Cinclorhamphus cruralis, 254.
cinerascens, Circus, 13.
cinerea, Leucospiza, **36**, 35, 46.
——, —— *cinerea*, 42.
Cinereous Eagle, 161.
cinereus, Astur, 36, 38, 39, 40, 47, 49.
——, *Buteo*, 13.
——, *Sparvius*, 36, 38.
Circaëtus, 5, 8, 16.
Circus, **10**, 5, 8, 9, 11, 12, 13, 14, 15, 16, 23, 34, 177.
—— *æruginosus*, 10, 11, 13, 26, 177.

Circus approximans, **24**, 17, 26, 32, 411.
—— —— *approximans*, 32.
—— —— *drummondi*, 33.
—— —— *gouldi*, 16, 24, 32, 33.
—— —— *inexpectatus*, 24, 25, 32, 33.
—— —— *wolfi*, 32.
—— *assimilis*, **18**, 9, 10, 11, 15, 16, 17, 20, 21, 22, 24, 25, 26, 28, 31.
—— —— *assimilis*, 19.
—— —— *quirindus*, **23**.
—— —— *rogersi*, 19, 23.
—— *cinerascens*, 13.
—— *cyaneus*, 13, 15.
—— *gouldi*, 20, 22, 24, 26, 27, 28, 29, 30, 31, 32.
—— —— *wolfi*, 32.
—— *jardinii*, 18, 20, 28.
—— *macropterus*, 10.
—— *pallidus*, 13.
—— *pygargus*, 10, 11, 13, 15.
—— *rogersi*, 18.
—— *rufus*, 13.
—— *teesa*, 129.
—— *wolfi*, 26, 32.
cirrhocephalus, Accipiter, **76**, 39, 74, 75, 164, 184.
——, —— *cirrhocephalus*, 81.
——, *Nisus*, 77.
——, *Paraspizias*, 77.
——, *Uraspiza*, 77.
cirrocephalus, Accipiter cirrocephalus, 77.
——, *Astur cirrocephalus*, 77, 80.
——, *Sparvius*, 74, 76, 78.
clara, Leucospiza clara, 36, 44.
clarus, Astur, 36, 38, 47.
——, —— *clarus*, 36.
——, *Falco*, 38, 39.
clelandi, Athene, 324, 384.
——, *Ninox*, 305, 313, 314, 315, 317, 321, 325, 328.
——, *Spiloglaux*, 309.
——, —— *boobook*, 311, 313, 326.
——, —— *novæseelandiæ*, 329, 330, 331, 333.
Collared Sparrow-Hawk, **76**.
columbarius, Nisus, 13.
connivens, Athene, 335.
——, *Buteo*, 335.
——, *Falco*, 335, 337, 338.
——, *Hieracoglaux*, **335**, 305, 334, 341, 345, 358.
——, —— *connivens*, 336, 344, 345, 346.
——, *Hiracoglaux*, 336.
——, *Ieraglaux*, 335.
——, *Ieroglaux*, 335.
——, *Jeraglaux*, 335.
——, *Ninox*, 335, 341, 342, 343, 344, 345, 346, 348, 358.
——, —— *connivens*, 336, 346, 347.
——, *Noctua*, 335.
contempta, Tyto alba, 371.
cooktowni, Astur clarus, 36, 37.
——, *Leucospiza cinerea*, 42.
——, —— *clara*, 36.
coongani, Aquila morphnoides, 118, 123.
——, *Hieraaetus morphnoides*, 118.
Cooperastur, 6, 73.
cooperii, Accipiter, 73.
Corone australis, 288.
Cream-bellied Falcon, 260, 262.
Crested Hawk, **216**.
cristatus, Buteo, 295, 301.
——, *Hieraëtus*, 118.
——, *Pandion*, 295.
——, —— *haliaëtus*, 296, 302.
cruenta, Urospiza fasciata, 57, 62, 65, 68, 69, 70, 71.
cruentus, Astur, 56, 57, 62, 63, 64, 65, 67, 68, 69, 89, 90.
——, —— *fasciatus*, 57, 65, 66.
——, —— *torquatus*, 67.
cruralis, Cinclorhamphus, 254.
cuculoides, Aviceda, 214.
——, *Baza*, 211.
Cuculus inornatus, 185.
Cuncuma, **131**, 9, 132.
—— *leucogaster*, **133**, 131, 132, 134.
—— *leucorypha*, 131, 132.
cuneicaudata, Aquila, 95.
cyaneus, Circus, 13, 15.
cyclops, Strix, 374, 378, 381, 383, 384.
——, *Tyto*, 385, 391, 392.

Dædalion candidum, 43.
Dactylostrix, 360, 361.
Daptrius, 5.
decepta, Gypoictinia, 188.
——, —— *melanosterna*, 189, 194.
Delicate Owl, **365**.
delicatula, Aluco, 365.
——, —— *flammea*, 365.
——, *Strix*, 256, 342, 367, 368, 369, 374, 381, 396.
——, —— *flammea*, 365.
——, *Tyto alba*, 365, 371, 391.
delicatulus, Strix, 365, 367, 399.
delicatus, Strix, 365.
Dendrocygna eytoni, 191.
Dendrofalco, 221.
Dentiger, 145.
deroepstorffi, Tyto alba, 371.
detorta, Tyto alba, 371.
didima, Urospiza fasciata, 57, 58, 62, 65, 68, 69, 70, 71, 72.
didimus, Astur fasciatus, 57, 65, 66.
Dissodectes, 6, 222.
dombraini, Tyto longimembris, 374, 393, 401.
doriæ, Erythrotriorchis, 92.
——, *Megatriorchis*, 85, 86.
drummondi, Circus approximans, 33.
Dryotriorchis, 5.

Eagle, Cinereous, 161.
—— Hawk, **95**.
——, Lacteous, 43.

INDEX.

Eagle, Little, **118**, **416**.
——, Mountain, of New South Wales, 95, 98.
——, New Holland White, 43, 45.
——, Pondicherry, 147, 148.
——, Red-backed Sea-, **147**.
——, Wedge-tailed (Eagle-Hawk), **95**, **414**.
——, Whistling, **160**, **417**.
——, White-bellied, 133, 134.
——, —— - —— Sea-, **133**.
——, —— -headed Rufous, 147.
——, —— - —— Sea- (Red-backed Sea-Eagle), **147**.
Elanoides, 6, 7, 212, 294.
Elanus, **197**, 6, 7, 9, 201.
—— *axillaris*, 199, 201, 202, 203, 204, 206, 271.
—— —— *axillaris*, 199.
—— —— *parryi*, 199, 206.
—— *cœruleus*, 197, 205, 206.
—— *hypoleucus*, 205, 206, 207.
—— *leucurus*, 205, 206.
—— *melanopterus*, 199, 201.
—— *minor*, 205.
—— *notatus*, **199**, 198, 201, 202, 205, 206, 207.
—— *scriptus*, **208**, 198, 201, 202, 203, 205, 206, 207, 209, 271.
Ephthianura aurifrons, 254.
ernesti, *Falco peregrinus*, 248, 249.
——, *Rhynchodon*, 248.
——, *Tyto alba*, 371.
erythrauchen, *Accipiter*, 75.
Erythropus, 4, 6, 221, 222.
Erythrospizias, 5.
erythrothorax, *Baza*, 212.
Erythrotriorchis, **84**, 6, 9, 85, 86, 91, 92.
—— *doriæ*, 92.
—— *radiatus*, **87**, 84, 85, 92, 412.
—— *rufotibia*, 87, 92.
eudiabolus, *Accipiter* (*Astur*), 86.
Euhierax, 240.
Eustrinx, 360.
Eutolmaëtus, 116, 117.
—— *morphnoides*, 118.
—— *weiskei*, 123.
Eutriorchis, 5.
everardi, *Spiloglaux novæseelandiæ*, 332.
eximius, *Platycercus*, 245.
eytoni, *Dendrocygna*, 191.

Fair Falcon, 38.
Falco, **221**, 1, 4, 6, 7, 8, 9, 222, 223, 224, 225, 240, 252, 259, 281, 413.
—— *albus*, 43, 45.
—— *anatum*, 243.
—— *berigora*, 260, 262, 273, 276.
—— —— *orientalis*, 260.
—— *bonelli*, 117.
—— *candicans*, 235.
—— *canus*, 57, 58.
—— *cenchroides*, 283.
—— *clarus*, 38, 39.
Falco connivens, 335, 337, 338.
—— *fasciinucha*, 248.
—— *frontatus*, 227, 228, 231, 232, 235, 338.
—— —— *apsleyi*, 227.
—— —— *frontatus*, 227.
—— —— *murchisonianus*, 227.
—— *fucosus*, 95, 97.
—— *glaucopis*, 335.
—— *gyrfalco*, 235.
—— *haliætus*, 295.
—— *hypoleucus*, **234**, 186, 235, 236, 237, 238, 252, 420, 422.
—— —— *ashbyi*, 238.
—— —— *ashleyi*, 234.
—— —— *hypoleucus*, 238.
—— *indus*, 147.
—— *islandicus*, 235.
—— *leucaëtos*, 43, 45.
—— *leucogaster*, 133, 135.
—— *leuphotes*, 215.
—— *longipennis*, **226**, 228, 232, 243.
—— *longipennis apsleyi*, 227, 232.
—— —— *longipennis*, 227, 231.
—— —— *murchisonianus*, 227, 232.
—— —— *samueli*, 232.
—— *lophotes*, 215.
—— *lunatus*, 227.
—— *lunulatus*, 226, 228, 229, 230, 231, 258, 338.
—— —— *apsleyi*, 227.
—— —— *lunulatus*, 227, 232.
—— —— *murchisonianus*, 227.
—— *macrodactylus*, 77.
—— *macropus*, 228, 241, 243, 246.
—— *melanogenys*, 228, 235, 241, 243, 244, 245, 246, 249, 250, 256, 258, 422.
—— *melanops*, 77, 83.
—— *melanotus*, 227, 228, 231, 232.
—— *migrans*, 171.
—— *minor*, 243.
—— *niger*, 253, 257.
—— *nisus*, 76, 78.
—— *novæhollandiæ*, 43, 45.
—— *novæzælandiæ*, 162.
—— *pacificus*, 185.
—— *pennatus*, 117, 118, 123.
—— *peregrinoides*, 243.
—— *peregrinus*, 241, 242, 243, 248.
—— —— *anatum*, 248.
—— —— *babylonicus*, 248.
—— —— *brookei*, 248.
—— —— *calidus*, 248, 249.
—— —— *cassini*, 248.
—— —— *ernesti*, 248, 249.
—— —— *macropus*, 242, 248, 249, 250.
—— —— *melanogenys*, 241, 250.
—— —— *minor*, 248.
—— —— *pealei*, 248.
—— —— *pelegrinoides*, 248, 249.
—— —— *peregrinator*, 248.
—— —— *peregrinus*, 247.

Falco peregrinus radama, 248.
—— —— *riphœus*, 248.
—— —— *submelanogenys*, 241, 250.
—— *pondicerianus*, 156.
—— —— *apud*, 153.
—— *ponticerianus*, 147, 157.
—— *radiatus*, 56, 62, 87, 89.
—— *raii*, 36.
—— *rufiventer*, 227, 231.
—— *rupicolus*, 285.
—— *subbuteo*, 221, 223.
—— —— *frontatus*, 227.
—— *subniger*, 253, 254, 256, 257, 258, 413, 422.
—— *tinnunculoides*, 285.
—— *tinnunculus*, 285.
—— *torquatus*, 63, 78.
—— *vespertinus*, 224.
Falcon, Ash-headed, 58.
——, Axillary, 200.
——, Black, **253**, **421**.
——, —— -cheeked, **241**.
——, Cream-bellied, 260, 262.
——, Fair, 38.
——, Grey, **234**, **420**.
——, Hooded, 243.
——, Little, **226**.
——, Lunated, 226.
——, Parametta, 283, 285.
——, Radiated, 87.
——, Winking, 335, 337.
Falcula, 281.
fasciata, *Urospiza*, **56**, 54, 78, 89.
——, —— *fasciata*, 57, 65, 68, 69, 70.
fasciatus, *Astur*, 40, 56, 60, 62, 63, 65, 66, 67.
——, —— *fasciatus*, 57, 65, 66.
fasciinucha, *Falco*, 248.
Fish-Hawk (White-headed Osprey), **295**.
Flammea, 360, 363, 364.
—— *flammea*, 372.
—— —— *novæhollandiæ*, 372.
—— *vulgaris*, 363.
flammea, *Flammea*, 372.
——, *Strix*, 362, 363, 365, 367, 368, 372.
——, *Tyto*, 372.
——, —— *alba*, 391.
floccosus, *Pycnoptilus*, 317.
fortis, *Athene*, 335, 337, 338, 384.
——, *Surnia*, 335.
fringillarius, *Accipiter*, 73.
frontata, *Athene*, 335.
——, *Noctua*, 335, 337.
frontatus, *Falco*, 227, 228, 231, 232, 235, 338.
——, —— *frontatus*, 227.
——, —— *subbuteo*, 227.
——, *Hypotriorchis*, 227.
fucosa, *Aquila*, 95, 338.
——, *Uraetus*, 95.
——, *Uroaëtus*, 95.
fulva, *Strix*, 322, 329.
furcata, *Tyto alba*, 371, 391.
furcatus, *Milvus*, 13.
fusca, *Ptilotis*, 184.
fuscosa, *Aquila*, 95.
fuscosus, *Falco*, 95, 97.

galei, *Tyto*, 374.
——, —— *novæhollandiæ*, 396.
Gampsonyx, 6.
garuda, *Haliœtus*, 157.
georgiæ, *Tyto longimembris*, 398.
Gennaia, 4, 6, 221, 222, 252.
—— *hypoleuca*, 234.
—— *subniger*, 253.
Geranoaëtus, 6, 8.
Geranospizias, 5, 8, 16.
girrenera, *Haliaëtus*, 147, 153, 154, 155, 156, 157, 159.
——, —— *indus*, 157.
——, *Haliastur*, 147, 152.
——, —— *indus*, 147, 148.
glaucopis, *Falco*, 335.
glaucops, *Tyto alba*, 371.
Glaucopterix, 10.
Glaucopteryx, 10, 13.
Glaucostrix, 360.
Glaux, 360, 362.
Glyphidiura, 360.
goldiei, *Ninox*, 332.
Goshawk, Australian, **56**.
——, Grey, **36**.
——, Red, **87**, **412**.
——, White, **43**.
gouldi, *Circus*, 20, 22, 24, 26, 27, 28, 29, 30, 31, 32.
——, —— *approximans*, 16, 24, 32, 33.
gouldii, *Pandion*, 295.
govinda, *Milvus*, 178, 179.
——, —— *migrans*, 180.
gracilirostris, *Tyto alba*, 371.
Grallina picata, 245.
Grass Owl, **398**.
Graucalus melanops, 166.
Grey Falcon, **234**, **420**.
—— Goshawk, **36**.
guatemalæ, *Tyto alba*, 371.
gurneyi, *Baza subcristata*, 219, 220.
guttata, *Tyto alba*, 371.
Gypaëtus, 5, 8.
Gyparchus, 5.
Gypohierax, 5, 8.
Gypoictinia, **187**, 6, 9.
—— *decepta*, 188.
—— *melanosterna*, **188**, 187, 192, 193, 194, 419, 420.
—— —— *decepta*, 189, 194.
—— —— *melanosterna*, 188.
—— *melanosternon*, 256.
Gyps, 5, 8.
Gypsictinia, 187.
Gypsoictinia, 187.
gyrfalco, *Falco*, 235.

INDEX.

hæmatodus, Trichoglossus, 388.
Haliaëtus, 6, 7, 127, 131, 132.
—— *albicilla*, 135.
—— *australis*, 148.
—— *calei*, 87, 89.
—— *canorus*, 90, 160, 162.
—— *girrenera*, 147, 153, 154, 155, 156, 157, 159.
—— *leucogaster*, 97, 131, 133, 135, 136, 137, 141, 143.
—— —— *leucogaster*, 134.
—— —— *pallidus*, 134.
—— *leucosternus*, 147.
—— *sphenurus*, 133, 139.
haliaëtus, Pandion, **295**, 293, 301.
Haliætus caleyi, 89.
—— *garuda*, 157.
haliætus, Falco, 295.
Haliastur, **145**, 6, 7, 9, 146, 413.
—— *girrenera*, 147, 152.
—— *indus*, **147**, 9, 145, 149, 153, 154, 155, 156, 180.
—— —— *ambiguus*, 155, 156.
—— —— *girrenera*, 147, 148, 157.
—— —— *indus*, 156.
—— —— *intermedius*, 155, 156.
—— —— *leucosternus*, 148, 156.
—— —— *subleucosternus*, 148, 156.
—— *intermedius*, 149, 153, 154, 155.
—— *leucosternum*, 147, 153.
—— *leucosternus*, 147.
—— *sphenurus*, **160**, 9, 90, 161, 164, 165, 167, 169, 413, 417, 422.
—— —— *sarasini*, **169.**
—— —— *territori*, 161, 169.
Halinertus, 145.
—— *sphenurus*, 161.
halmaturina, Ninox boobook, 311, 312, 325.
——, *Spiloglaux*, 309.
——, —— *boobook*, 311, 331, 333.
Harpa, 6, 7.
Harpagus, 4, 6, 221.
Harpyhaliaëtus, 6.
Harpyopsis, 6.
Harrier, Allied (Swamp-Hawk), **24, 411.**
——, Spotted, **18.**
Hawk, Bird, 241, 251.
——, Brown, **260, 422.**
——, Collared Sparrow-, **76.**
——, Crested, **216.**
——, Eagle-, **95.**
——, Fish- (White-headed Osprey), **295.**
——, New Holland Sparrow-, 76.
——, Orange-speckled, 262.
——, Swamp-, **24.**
——, White, 45.
Helotarsus, 5, 8, 16.
Henicopernis, 6.
Herbivocula, 85.
Herpetotheres, 5, 7.
Heteropygia acuminata, 257.
Heterospizias, 6.
Hieraaëtus, **116**, 8, 9, 117.
—— *bonelli*, 116.
Hieraaetus coongani, 118.
—— —— *morphnoides*, 118
—— *pennatus*, **118**, 116, 416.
—— —— *morphnoides*, 123, 124.
—— —— *pennatus*, 123, 124.
—— —— *weiskei*, 123.
Hieracidea, 6, 259.
—— *berigora*, 238, 258, 260, 263, 264, 265, 266, 267, 270, 271, 272, 273, 279, 280, 422.
—— —— *novæ-guineæ*, 280.
—— *occidentalis*, 261, 266, 269, 270, 271, 272, 276, 279.
—— *orientalis*, 92, 184, 261, 263, 265, 266, 267, 268, 269, 271, 272, 273, 274, 276, 279, 287, 422.
Hieracaëtus, 116.
Hieracoglaux, **334**, 305, 307, 349, 355.
—— *connivens*, **335**, 334, 336, 341, 345, 358.
—— —— *addenda*, 336, 345.
—— —— *assimilis*, 348.
—— —— *connivens*, 336, 344, 345, 346.
—— —— *occidentalis*, 336, 345, 346.
—— —— *peninsularis*, 336, 346, 347.
—— —— *suboccidentalis*, 337, 344, 345, 346.
—— —— *rufostrigatus*, 348.
—— *occidentalis*, 335.
—— —— *rufus*, 350.
—— *strenua*, 305, 356.
—— *strenuus*, 338.
Hieracospiza, 73.
Hieracospizias, 73.
Hieraëtus, 116.
—— *cristatus*, 118.
—— *morphnoides*, 118.
—— *pennatus*, 122.
Hieraspiza, 73.
Hieraspizias, 73.
Hierax, 4, 73, 221.
Hieroaëtus, 116.
Hierofalco, 4, 6, 7, 8, 221, 222, 223, 224, 252.
—— *candicans*, 222.
—— *hypoleucus*, 234.
—— *subniger*, 253.
Hooded Falcon, 243.
humeralis, Ninox, 350, 352, 353, 354.
——, —— *rufa*, 353.
——, *Rhabdoglaux*, 305.
——, —— *rufa*, 354.
Hybris, 360, 362, 363.
hyder, Astur, 129.
Hydrictinia, 170, 177.
—— *affinis*, 171.
Hydroictinia, 170.
hypoleuca, Gennaia, 234.
hypoleucus, Elanus, 205, 206, 207.
——, *Falco*, **234**, 186, 235, 236, 237, 238, 252, 420, 422.

hypoleucus, Falco hypoleucus, 238.
——, *Hierofalco*, 234.
Hypotriorchis, 4, 6, 7, 8, 221, 222.
—— *frontatus*, 227.
—— *lunulatus*, 227.
—— *rufiventer*, 227.

Ibycter, 5.
Ichthyaëtus leucogaster, 134.
Ictinaetus, 145.
Ictinia, 6, 7.
Ictiniastur, **146**.
—— *sphenurus*, 146, 161.
Ictinoaëtus, 145.
Ieracidea, **259**, 4, 8, 9, 221, 225, 232.
—— *berigora*, **260**, 259, 264, 269, 270, 276, 278, 279, 422.
—— —— *berigora*, 261, 274, 277, 278, 280.
—— —— *centralia*, **277**, 262.
—— —— *kempi*, **277**, 262, 278.
—— —— *melvillensis*, 261, 262, 274, 278, 280.
—— —— *novæ-guineæ*, 280.
—— —— *occidentalis*, 261, 274, 278, 280.
—— —— *orientalis*, 276, 277, 278.
—— —— *tasmanica*, 262, 276.
—— *occidentalis*, 260, 264, 270, 279, 422.
—— *orientalis*, 261, 279.
Ieraëtus, 116.
Ieraglaux, 334.
—— *connivens*, 335.
—— *rufa*, 350.
—— *strenua*, 356.
Ierax, 73.
Ieroglaux, 334.
—— *connivens*, 335.
immaculata, Cerchneis, 283.
indica, Tyto alba, 391.
indicus, Butastur, 130.
indus, Falco, 147.
——, *Haliastur*, **147**, 9, 145, 149, 153, 154, 155, 156, 180.
——, —— *indus*, 156.
inexpectatus, Circus approximans, 25, 32, 33.
inornatus, Cuculus, 185.
insularis, Astur approximans, 71.
——, *Tyto alba*, 371, 391.
——, *Urospiza fasciata*, 68, 72.
intermedius, Haliastur, 149, 153, 154, 155.
——, —— *indus*, 155, 156.
isiurus, Milvus, 182.
islandicus, Falco, 235.
isura, Lophoictinia, **182**, 181, 184, 185.
isurus, Milvus, 182, 186, 420.
——, —— *isurus*, 182.

jardinii, Circus, 18, 20, 28.
——, *Spilocircus*, 18.
——, *Strigiceps*, 18.
javanica, Strix, 367.
——, *Tyto alba*, 371.
Jeracidea, 259.
Jeracidia, 259.
Jerætus, 116.
Jeraglaux, 334.
—— *boobook*, 309.
—— *connivens*, 335.
—— *maculatus*, 309.
—— *marmoratus*, 309.
—— *strenua*, 356.
Jeraspizia, 73.
jerdoni, Lophastur, 211, 213, 214.

kempi, Ieracidea berigora, **277**, 262, 278.
——, *Lophastur subcristatus*, **220**.
Kestrel, Nankeen, **283, 422.**
kimberli, Tyto, 373.
——, —— *novæhollandiæ*, 374, 385, 386, 387, 388, 395, 396.
Kite, Allied, **171, 418.**
——, Black-shouldered, **199.**
——, Letter-winged, **208.**
——, Square-tailed, **182.**
korschun, Accipiter, 177.
——, *Milvus*, 177, 178.
——, —— *korschun*, 177.

Lacteous Eagle, 43.
Lanius, 1.
leachi, Spiloglaux boobook, 311, 326.
——, —— *novæseelandiæ*, 329, 330.
Lepidogenys, 213, 214.
—— *subcristatus*, 216.
Leptodon, 6, 7, 212, 294.
Leptohierax, 73.
Letter-winged Kite, **208.**
leucaëtos, Falco, 43, 45.
leucocephalus, Pandion, 295, 301.
——, —— *haliaëtus*, 295.
leucogaster, Blagrus, 134.
——, *Cuncuma*, **133**, 131, 132, 134.
——, *Falco*, 133, 135.
——, *Haliaëtus*, 97, 131, 133, 135, 136, 137, 141, 143.
——, —— *leucogaster*, 134.
——, *Ichthyaëtus*, 134.
——, *Polioætus*, 134, 357.
——, *Pontoaëtus*, 134.
leucopsis, Athene, 384.
——, *Xerophila*, 256.
Leucopternis, 6, 8.
leucorypha, Cuncuma, 131, 132.
leucosoma, Leucospiza novæhollandiæ, 44.
leucosomus, Accipiter novæhollandiæ, 53.
——, *Astur*, 44, 47, 52.
——, —— *novæhollandiæ*, 44.
Leucospiza, **34**, 9, 54.
—— *cinerea*, **36**, 35, 46.
—— —— *cinerea*, 42.
—— —— *cooktowni*, 42.
—— —— *robusta*, 42.

INDEX.

Leucospiza clara clara, 36, 44.
—— —— *cooktowni*, 36.
—— —— *robusta*, 36.
—— *novæhollandiæ*, **43**, 34, 35, 36.
—— —— *leucosoma*, 44.
—— —— *novæhollandiæ*, 44.
—— *raii*, 36, 37.
Leucospizia, 34.
Leucospizias, 5, 8, 34.
—— *novæhollandiæ*, 44.
leucosternon, *Milvus*, 188.
leucosternum, *Haliastur*, 147, 153.
leucosternus, *Haliaëtus*, 147.
——, *Haliastur*, 147.
——, —— *indus*, 148, 156.
leucurus, *Elanus*, 205, 206.
leuphotes, *Baza*, 212, 213, 214.
——, *Falco*, 215.
lifuensis, *Tyto alba*, 372.
Limnaëtus, 6.
Little Eagle, **118**, **416**.
—— Falcon, **226**.
liventer, *Butastur*, 130.
longimembris, *Strix*, 398, 400.
——, *Tyto*, **398**, 360, 361.
——, —— *longimembris*, 398.
longipennis, *Falco*, **226**, 228, 232, 243.
——, —— *longipennis*, 227, 231.
Lophastur, **211**, 214, 215.
—— *jerdoni*, 211, 213, 214.
—— *subcristatus*, **216**, 214.
—— —— *subcristatus*, 220.
—— —— *kempi*, **220**.
—— —— *queenslandicus*, 220.
Lophoaëtus, 6, 7.
Lophogyps, 5.
Lophoictinia, **181**, 6, 9.
—— *isura*, **182**, 181, 184, 185.
—— —— *westraliensis*, 183.
Lophospizias, 5.
Lophotes, 213, 214.
lophotes, *Baza*, 212, 214.
——, *Falco*, 215.
Lophotriorchis, 6.
lulu, *Tyto alba*, 371.
Lunated Falcon, 226.
lunatus, *Falco*, 227.
lunulatus, *Falco*, 226, 228, 229, 230, 231, 258, 338.
——, —— *lunulatus*, 227, 232.
——, *Hypotriorchis*, 227.
——, *Sparvius*, 226.
lurida, *Ninox*, 311, 313, 321, 327, 328, 331.
——, —— *boobook*, 311, 326.
——, *Spiloglaux boobook*, 311.
——, —— *novæseelandiæ*, 331, 332.

macgillivrayi, *Ninox*, 312, 321.
——, —— *boobook*, 311. 326.
——, *Spiloglaux boobook*, 311.
——, —— *novæseelandiæ*, 332.
Machærirhamphus, 6, 7.
mackayi, *Astur fasciatus*, 57.
——, *Tyto novæhollandiæ*, 374, 385, 387, 388, 394, 396.
macrodactylus, *Falco*, 77.
macropterus, *Circus*, 10.
macropus, *Falco*, 228, 241, 243, 246.
——, —— *peregrinus*, 242, 248, 249.
——, *Rhynchodon peregrinus*, 242, 251.
maculata, *Athene*, 309, 324.
——, *Ninox*, 305, 310, 313, 314, 315, 316, 317, 321, 327, 328.
——, —— *boobook*, 311, 325.
——, *Noctua*, 309, 324, 384.
——, *Nyctipetes*, 309.
——, *Spiloglaux*, 310.
——, —— *boobook*, 311, 326.
——, —— *novæseelandiæ*, 329, 330, 331, 333.
——, *Strix novæseelandiæ*, 322, 330.
——, *Tyto alba*, 371.
maculatus, *Jeraglaux*, 309.
maculosa, *Urospiza fasciata*, 58.
maculosus, *Astur*, 57, 59, 71.
madagascariensis, *Baza*, 211, 212.
——, *Nesobaza*, 213, 214.
magna, *Megastrix tenebricosa*, 404, 407, 408.
——, *Tyto tenebricosa*, 404, 405, 406.
magnirostris, *Baza*, 212.
——, *Nisus*, 13.
marmorata, *Athene*, 309, 324.
——, *Ninox boobook*, 311, 319, 325.
——, *Spiloglaux*, 309.
——, —— *boobook*, 311, 326.
——, —— *novæseelandiæ*, 329, 330.
marmoratus, *Jeraglaux*, 309.
Masked Owl, **373**.
meeki, *Tyto alba*, 371.
megaera, *Strix*, 404.
megala, *Baza subcristata*, 219, 220.
Megastrix, **402**, 307, 403, 406.
—— *multipunctata*, 404.
—— *perconfusa*, **408**.
—— *tenebricosa*, **404**, 402, 407.
—— —— *arfaki*, 408.
—— —— *tenebricosa*, 404, 408.
—— —— *magna*, 404, 407, 408.
—— —— *multipunctata*, 404, 408.
Megatriorchis, 6, 85, 91, 92, 406, 407.
—— *doriæ*, 85, 86.
melanogenys, *Falco*, 228, 235, 241, 243, 244, 245, 246, 249, 250, 256, 258, 422.
——, —— *peregrinus*, 241, 250.
melanops, *Accipiter*, 77, 83.
——, *Falco*, 77, 83.
——, *Graucalus*, 166.
melanopterus, *Elanus*, 199, 201.
melanosterna, *Gypoictinia*, **188**, 187, 192, 193, 194, 419, 420.
——, —— *melanosterna*, 188.
melanosternon, *Buteo*, 188.

melanosternon, Gypoictinia, 256.
——, *Milvus*, 188.
melanotis, Milvus, 178, 179.
——, —— *migrans*, 180.
melanotus, Falco, 227, 228, 231, 232.
Melierax, 5, 8.
melvillensis, Ieracidea berigora, 261, 262, 274, 278, 280.
——, *Ninox boobook*, 311, 326, 328.
——, *Pandion haliaëtus*, 296, 302.
——, *Spiloglaux boobook*, 311.
——, —— *novæseelandiæ*, 331.
——, *Tyto*, 373.
——, —— *novæhollandiæ*, 374, 385, 389, 397.
Micrastur, 5, 7.
microhaliaëtus, Pandion haliaëtus, 296.
Microhierax, 6, 7.
migrans, Falco, 171.
——, *Milvus*, **171**, 170, 177, 178, 179, 180, 418.
——, —— *migrans*, 177.
milligani, Cerchneis cenchroides, 284, 291.
Milvago, 5, 7.
Milvaquila, 145.
Milvus, **170**, 6, 7, 9, 12, 13, 154, 177, 181, 187, 195, 413.
—— *æruginosus*, 177.
—— *affinis*, 171, 174, 175, 178, 179, 209, 256, 413, 418, 422, 423.
—— *ater*, 13, 173.
—— *aterrimus*, 171.
—— *furcatus*, 13.
—— *govinda*, 178, 179.
—— *isiurus*, 182.
—— *isurus*, 182, 186, 420.
—— —— *isurus*, 182.
—— —— *westraliensis*, 182.
—— *korschun*, 177, 178.
—— —— *affinis*, 171.
—— —— *korschun*, 177.
—— —— *napieri*, 172.
—— *leucosternon*, 188.
—— *melanosternon*, 188.
—— *melanotis*, 178, 179.
—— *migrans*, **171**, 170, 177, 178, 179, 180, 418.
—— —— *affinis*, 180.
—— —— *govinda*, 180.
—— —— *melanotis*, 180.
—— —— *migrans*, 177.
—— *milvus*, 170.
—— *pacificus*, 182, 185.
—— *palustris*, 179.
—— *regalis*, 183.
—— *sphenurus*, 146, 160.
—— *vulgaris*, 13.
minnie, Notofalco subniger, 253.
minor, Elanus, 205.
——, *Falco*, 243.
——, —— *peregrinus*, 248.
mixta, Ninox, 332.
——, —— *boobook*, 311, 326.
——, *Spiloglaux*, 309.
——, —— *boobook*, 311.
——, —— *novæseelandiæ*, 331, 332, 333.
morphnoides, Aquila, 118, 122.
——, *Butaëtus*, 118.
——, *Eutolmaëtus*, 118.
——, *Hieraaetus morphnoides*, 118.
——, —— *pennatus*, 123, 124.
——, *Hieraëtus*, 118.
——, *Nisaetus*, 118, 122, 123, 124, 164, 184, 192, 271.
——, *Utolmaetus*, 118.
Morphnus, 6, 7.
motacilloides, Sauloprocta, 418.
Mountain Eagle of New South Wales, 95, 98.
Mouse Owl, 373.
multipunctata, Megastrix, 404.
——, —— *tenebricosa*, 404, 408.
——, *Tyto tenebricosa*, 404, 405, 406.
murchisonianus, Falco frontatus, 227.
——, —— *longipennis*, 227, 232.
——, —— *lunulatus*, 227.
Myotha, 364.
Myzantha, 185.

Nankeen Kestrel, **283, 422.**
napieri, Milvus korschun, 172.
Nauclerus, 6.
naumanni, Cerchneis, 281.
Neophron, 5, 8.
Neopus, 6.
Nesierax, 9.
Nesobaza, **213**, 214, 215.
—— *madagascariensis*, 213, 214.
New Holland Sparrow-Hawk, 76.
—— —— White Eagle, 43, 45.
—— Zealand Owl, 322.
niger, Falco, 253, 257.
nigrescens, Tyto alba, 371.
Ninox, 305, 308, 357.
—— *albaria*, 327.
—— *boobook*, 310, 313, 314, 315, 317, 318, 320, 321, 327, 328, 332, 333.
—— —— *boobook*, 311, 321, 325, 326, 328.
—— —— *halmaturina*, 311, 312, 325.
—— —— *lurida*, 311, 326.
—— —— *macgillivrayi*, 311, 326.
—— —— *maculata*, 311, 325.
—— —— *marmorata*, 311, 319, 325.
—— —— *melvillensis*, 311, 326, 328.
—— —— *mixta*, 311, 326.
—— —— *ocellata*, 311, 321, 325.
—— —— *royana*, 328.
—— —— *venatica*, 328.
—— *boweri*, 328.
—— *clelandi*, 305, 313, 314, 315, 317, 321, 325, 328.

INDEX.

Ninox connivens, 335, 341, 342, 343, 344, 345, 346, 348, 358.
—— —— *addenda*, 336.
—— —— *assimilis*, 347, 348.
—— —— *connivens*, 336, 346, 347.
—— —— *occidentalis*, 336, 344, 345, 346, 347.
—— —— *peninsularis*, 336, 344.
—— —— *rufostrigata*, 347.
—— —— *suboccidentalis*, 336, 344.
—— *goldiei*, 332.
—— *humeralis*, 350, 352, 353, 354.
—— —— *queenslandica*, 350, 353.
—— *lurida*, 311, 313, 321, 327, 328, 331.
—— *macgillivrayi*, 312, 321.
—— *maculata*, 305, 310, 313, 314, 315, 316, 317, 321, 327, 328.
—— *mixta*, 332.
—— *novæzealandiæ*, 327, 333.
—— *occidentalis*, 336, 344, 346.
—— *ocellata*, 310, 313, 320, 321, 332.
—— *peninsularis*, 336, 342, 343, 344, 346, 347.
—— *queenslandica*, 354.
—— *rufa*, 350, 352, 353, 354, 359.
—— —— *humeralis*, 353.
—— —— *queenslandica*, 350.
—— —— *rufa*, 350, 353.
—— *rufistrigata*, 348.
—— —— *assimilis*, 348.
—— *strenua*, 305, 355, 358, 359.
—— —— *strenua*, 356.
—— —— *victoriæ*, 356.
Nisaëtus, 6, 7.
Nisaetus morphnoides, 118, 122, 123, 124, 164, 184, 192, 271, 417.
—— *pennatus*, 122, 123, 417.
Nisoides, 5, 8.
Nisus, 12, 13, 73.
—— *australis*, 63, 70, 71.
—— *cirrhocephalus*, 77.
—— *columbarius*, 13.
—— *magnirostris*, 13.
—— *radiatus*, 87.
—— *torquatus*, 76.
—— *vulgaris*, 13.
nisus, Accipiter, 73, 75.
——, *Falco*, 76, 78.
niveus, Sparvius, 43.
Noctua boobook, 309, 323, 324, 384.
—— *connivens*, 335.
—— *frontata*, 335, 337.
—— *maculata*, 309, 324, 384.
—— *strenua*, 356.
—— *venatica*, 327.
notatus, Elanus, **199,** 198, 201, 202, 205, 206, 207.
Notofalco, **252,** 9, 225.
—— *subniger*, **253,** 252, 421.
—— —— *minnie*, 253.
—— —— *subniger*, 253.
novæ-guineæ, Hieracidea berigora, 280.
——, *Ieracidea berigora*, 280.
novæhollandiæ, Accipiter novæhollandiæ, 53.
——, *Astur*, 37, 38, 40, 43, 46, 47, 48, 49, 52.
——, —— *novæhollandiæ*, 44.
——, *Falco*, 43, 45.
——, *Flammea flammea*, 372.
——, *Leucospiza*, **43,** 34, 35, 36.
——, —— *novæhollandiæ*, 44.
——, *Leucospizias*, 44.
——, *Strix*, 306, 309, 322, 338, 373, 378, 379, 380, 381, 382, 383, 384, 401.
—— *Trichoglossus*, 245.
——, *Tyto*, **373,** 361, 372, 385, 386, 387, 388, 389, 391, 393, 401, 406.
——, —— *novæhollandiæ*, 374, 385, 387, 388, 393, 394.
novæseelandiæ, Spiloglaux, **309,** 332.
——, —— *novæseelandiæ*, 329.
novæzelandiæ, Athene, 324.
——, *Falco*, 162.
——, *Ninox*, 327, 333.
Nyctipetes boobook, 309.
—— *maculata*, 309.
Nyroca australis, 243.

obscura, Anas, 243.
occidentalis, Barnardius, 289.
——, *Hieracidea*, 261, 266, 269, 270, 271, 272, 276, 279.
——, *Hieracoglaux*, 335.
——, —— *connivens*, 336, 345, 346.
——, *Ieracidea*, 260, 264, 270, 279.
——, —— *berigora*, 261, 274, 278, 280, 422.
——, *Ninox*, 336, 344, 346.
——, —— *connivens*, 336, 344, 345, 346, 347.
ocellata, Athene, 309, 324.
——, *Ninox*, 310, 313, 320, 321, 332.
——, —— *boobook*, 311, 321, 325.
——, *Spiloglaux*, 309.
——, —— *boobook*, 311.
——, —— *novæseelandiæ*, 330, 331.
Onychotes, 6.
Orange-speckled Hawk, 262.
orientalis, Falco berigora, 260.
——, *Hieracidea*, 92, 184, 261, 263, 265, 266, 267, 269, 271, 272, 273, 274, 276, 279, 287, 422.
——, *Ieracidea*, 261, 279.
——, —— *berigora*, 276, 277, 278.
Osprey, White-headed (Fish-Hawk), **295.**
Otogyps, 5, 8.
Otus, 362.
Owl, Boobook, **309.**
——, Delicate, **365.**
——, Grass, **398.**
——, Masked, **373.**
——, Mouse, 373.
——, New Zealand, 322.
——, Powerful, **356.**
——, Rufous, **350.**
——, Sooty, **404.**

Owl, White-faced, 365.
——, Winking, **335.**

pacificus, *Falco*, 185.
——, *Milvus*, 182, 185.
pallida, *Baza subcristata*, 219, 220.
pallidus, *Circus*, 13.
——, *Haliaëtus leucogaster*, 134.
palumbarius, *Astur*, 13.
palustris, *Milvus*, 179.
Pandion, **293,** 6, 7, 9, 212.
—— *cristatus*, 295.
—— *gouldii*, 295.
—— *haliaëtus*, **295**, 293, 301.
—— —— *cristatus*, 296, 302.
—— —— *leucocephalus*, 295.
—— —— *melvillensis*, 296, 302.
—— —— *microhaliaëtus*, 296.
—— *leucocephalus*, 295, 301.
papuanus, *Accipiter cirrhocephalus*, 81.
Parametta Falcon, 283, 285.
Paraspizias, **74.**
—— *cirrhocephalus*, 77.
parryi, *Elanus axillaris*, 199, 206.
pealei, *Falco peregrinus*, 248.
pelegrinoides, *Falco peregrinus*, 248, 249.
——, *Rhynchodon*, 249.
penicillata, *Ptilotis*, 339.
peninsularis, *Hieracoglaux connivens*, 336, 346, 347.
——, *Ninox*, 336, 342, 343, 344, 346, 347.
——, —— *connivens*, 336, 344.
pennatus, *Falco*, 117, 118, 123.
——, *Hieraaëtus*, **118,** 116, 416.
——, —— *pennatus*, 123, 124.
——, *Hieraëtus*, 122.
——, *Nisaetus*, 122, 123.
perconfusa, *Megastrix tenebricosa*, **408.**
peregrinator, *Falco peregrinus*, 248.
peregrinoides, *Falco*, 243.
peregrinus, *Falco*, 241, 242, 243, 248.
——, —— *peregrinus*, 247.
——, *Rhynchodon*, **241**, 240, 242.
perlata, *Tyto alba*, 371.
Pernis, 6, 7, 127, 128, 211, 212, 214, 294.
—— *subcristata*, 216.
Pernopsis, 127, 128.
perplexa, *Tyto novæhollandiæ*, 374, 385, 386, 387, 388, 389, 393, 395.
personata, *Strix*, 338, 373, 381, 383, 384.
Phalcobœnus, 5, 7.
Phaps chalcoptera, 319.
picata, *Grallina*, 245.
Platycercus eximius, 245.
Podargus, 315, 317.
—— *strigoides*, 316, 318.
—— —— *rossi*, 319.
Poecilornis, 4, 221, 281.
poensis, *Tyto alba*, 391.
Polihierax, 4, 6, 7, 221.
Polioaëtus, 6, 7, 293.
—— *leucogaster*, 134, 357.
Poliornis, 127.
Polyboroides, 5.
Polyborus, 5, 7.
polycrypta, *Urospiza fasciata*, 68, 72.
polycryptus, *Accipiter fasciatus*, 65, 66, 67, 71.
pondicerianus, *Falco*, 156, 157.
Pondicherry Eagle, 147, 148.
Pontaëtus, 131.
ponticerianus, *Falco*, 147.
Pontoaëtus, 131.
—— *leucogaster*, 134.
Powerful Owl, **356.**
pratincola, *Tyto alba*, 371, 391.
Pseudaetus, 116.
Pseudogryphus, 5.
Pseudogyps, 5.
Pterocircus, 10.
Ptilotis fusca, 184.
—— *penicillata*, 339.
punctatissima, *Tyto alba*, 371, 391.
Pycnoptilus floccosus, 317.
Pygargus, 10, 15.
pygargus, *Circus*, 10, 11, 13, 15.

quaesitandus, *Accipiter cirrhocephalus*, 81, 82.
queenslandica, *Baza subcristata*, 216.
——, *Ninox*, 354.
——, —— *humeralis*, 350, 353.
——, —— *rufa*, 350.
——, *Rhabdoglaux*, 350.
——, —— *humeralis*, 351.
——, —— *rufa*, 354.
queenslandicus, *Lophastur subcristatus*, 220.
quirindus, *Circus assimilis*, **23.**

Rabdoglaux, 349.
radama, *Falco peregrinus*, 248.
Radiated Falcon, 87.
radiatus, *Accipiter*, 87.
——, *Astur*, 56, 62, 63, 87, 90, 91.
——, —— *radiatus*, 87.
——, *Erythrotriorchis*, **87**, 84, 85, 92, 412.
——, *Falco*, 56, 62, 87, 89.
——, *Nisus*, 87.
——, *Urospizias*, 87, 413, 414.
raii, *Astur*, 36, 37, 46.
——, *Falco*, 36.
——, *Leucospiza*, 36, 37.
rayi, *Astur*, 36, 48.
Red Goshawk, **87, 412.**
regalis, *Milvus*, 183.
Regerhinus, 6.
reinwardti, *Baza*, 212, 214.
——, —— *subcristata*, 219, 220.
Rhabdoglaux, **349**, 305, 307, 355.
—— *humeralis*, 305.
—— —— *queenslandica*, 351.
—— *queenslandica*, 350.

INDEX.

Rhabdoglaux rufa, **350**, 305, 349.
—— —— *humeralis*, 354.
—— —— *queenslandica*, 354.
—— —— *rufa*, 354.
—— *rufus*, 350.
Rhinogryphus, 5.
Rhodoglaux, 349.
Rhynchodon, **240**, 9, 222, 223, 224, 225, 227, 248, 252.
—— *ernesti*, 248.
—— *pelegrinoides*, 249.
—— *peregrinus*, **241**, 240, 242.
—— —— *macropus*, 242, 251.
—— —— *submelanogenys*, 242, 251.
—— *submelanogenys*, 241.
Rhynchofalco, 222, 223.
riordani, *Tyto novæhollandiæ*, 374, 375, 385, 388, 389, 393, 395.
riphæus, *Falco peregrinus*, 248.
robusta, *Leucospiza cinerea*, 42.
——, —— *clara*, 36.
robustus, *Astur clarus*, 36.
rogersi, *Circus*, 18.
——, —— *assimilis*, 19, 23.
rosenbergi, *Tyto alba*, 371.
rossi, *Podargus strigoides*, 319.
Rostrhamus, 6, 7.
royana, *Ninox boobook*, 328.
——, *Spiloglaux novæseelandiæ*, 333.
rubricollis, *Accipiter*, 75.
rufa, *Athene*, 350, 359.
——, *Baza*, 212.
——, —— *subcristata*, 219, 220.
——, *Ninox*, 350, 352, 353, 354, 359.
——, —— *rufa*, 350, 353.
——, *Rhabdoglaux*, **350**, 305, 349.
——, —— *rufa*, 354.
rufistrigata, *Ninox*, 348.
——, —— *connivens*, 347.
rufiventer, *Falco*, 227, 231.
——, *Hypotriorchis*, 227.
rufostrigatus, *Hieracoglaux connivens*, 348.
rufotibia, *Astur radiatus*, 87.
——, *Erythrotriorchis*, 87, 92.
Rufous Owl, **350**.
rufus, *Circus*, 13.
——, *Hieracoglaux*, 350.
——, *Ieraglaux*, 350.
——, *Rhabdoglaux*, 350.
rupicola, *Cerchneis*, 281.
rupicolus, *Falco*, 285.
Rupornis, 6, 8.

samueli, *Falco longipennis*, 232.
sanguinea, *Cacatua*, 193, 237.
sarasini, *Haliastur sphenurus*, **169**.
Sarcorhamphus, 5.
Sauloprocta motacilloides, 418.
Scelospizias, 5, 8.
Scelostrix, 360, 361.
schmitzi, *Tyto alba*, 371.
scriptus, *Elanus*, **208**, 198, 201, 202, 203, 205, 206, 207, 209, 271.
Sea-Eagle, Red-backed, **147**.
—— - ——, White-bellied, 133, 134.
—— - ——, —— -headed (Red-backed Sea-Eagle), **147**.
semitorquatus, *Barnardius*, 320.
Senex, 5, 7.
Serpentarius, 5.
sharpii, *Astur*, 63, 64, 66, 67, 71, 72.
Sooty Owl, **404**.
sororcula, *Tyto alba*, 371.
Sparrow-Hawk, Collared, **76**.
—— - ——, New Holland, 76.
sparverius, *Cerchneis*, 281.
Sparvius cinereus, 36, 38.
—— *cirrocephalus*, 74, 76, 78.
—— *lunulatus*, 226.
—— *niveus*, 43.
sphenurus, *Haliaëtus*, 133, 139.
——, *Haliastur*, **160**, 9, 90, 154, 161, 164, 165, 166, 167, 169, 413, 417, 422.
——, *Halinertus*, 161.
——, *Ictiniastur*, 146, 161.
——, *Milvus*, 146, 160.
Spilocircus, 10, 13, 15.
—— *jardinii*, 18.
Spiloglaux, **308**, 305, 306, 349.
—— *boobook*, 305, 309, 326, 331, 332.
—— —— *boobook*, 311.
—— —— *clelandi*, 311, 313, 326.
—— —— *halmaturina*, 311, 331, 333.
—— —— *leachi*, 311, 326.
—— —— *lurida*, 311.
—— —— *macgillivrayi*, 311.
—— —— *maculata*, 311, 326.
—— —— *marmorata*, 311, 326.
—— —— *melvillensis*, 311.
—— —— *mixta*, 311.
—— —— *ocellata*, 311.
—— —— *tregellasi*, 311, 326.
—— *boweri*, 309, 311, 313, 326, 331.
—— *clelandi*, 309.
—— *halmaturina*, 309.
—— *maculata*, 310.
—— *marmorata*, 309.
—— *mixta*, 309.
—— *novæseelandiæ*, **309**, 332.
—— —— *albaria*, 332.
—— —— *boobook*, 308, 329, 330, 331, 332.
—— —— *clelandi*, 329, 330, 331, 333.
—— —— *everardi*, 332.
—— —— *leachi*, 329, 330.
—— —— *lurida*, 331, 332.
—— —— *macgillivrayi*, 332.
—— —— *maculata*, 329, 330, 331, 333.
—— —— *marmorata*, 329, 330.
—— —— *melvillensis*, 331.
—— —— *mixta*, 331, 332, 333.

Spiloglaux novæseelandiæ novæseelandiæ, 329.
—— —— *ocellata*, 330, 331.
—— —— *royana*, 333.
—— —— *tregellasi*, 329, 330.
—— —— *venatica*, 329.
—— *ocellata*, 309.
Spilornis, 5, 8, 15, 16, 23.
Spizacircus, 10, 13.
Spizaëtus, 6, 7.
Spiziacircus, 10.
Spiziapteryx, 6.
Spiziastur, 6.
Spotted Harrier, **18**.
Square-tailed Kite, **182**.
strenua, Athene, 305, 307, 352, 356, 384.
——, *Hieracoglaux*, 305, 356.
——, *Ieraglaux*, 356.
——, *Jeraglaux*, 356.
——, *Ninox*, 305, 353, 358, 359.
——, —— *strenua*, 356.
——, *Noctua*, 356.
——, *Surnia*, 356.
strenuus, Berneyornis, **356**, 355.
——, *Hieracoglaux*, 338, 356.
Stridula, 360.
Strigiceps, 8, 10, 11, 13, 15, 16.
—— *jardinii*, 18.
strigoides, Podargus, 316, 318.
Strigymnhemipus, 360.
Strix, 1, 305, 360, 362, 363, 364, 367, 400, 402.
—— *alba*, 363, 365, 372.
—— *arfaki*, 407.
—— *boobook*, 309, 323.
—— *candida*, 398, 400.
—— *castanops*, 373, 377, 378, 379, 381, 382, 383, 384.
—— *cyclops*, 374, 378, 381, 383, 384.
—— *delicatula*, 256, 342, 367, 368, 369, 370, 374, 381, 396.
—— *delicatulus*, 365, 367, 399.
—— *delicatus*, 365.
—— *flammea*, 362, 363, 365, 367, 368, 372.
—— —— *delicatula*, 365.
—— *fulva*, 322, 329.
—— *megaera*, 404.
—— *novæhollandiæ*, 306, 338, 373, 378, 379, 380, 381, 382, 383, 384, 401.
—— —— *castanops*, 374, 380.
—— *novæseelandiæ*, 309, 322.
—— —— *maculata*, 322, 330.
—— *javanica*, 367.
—— *kimberli*, 373.
—— *longimembris*, 398, 400.
—— *personata*, 338, 373, 381, 383, 384.
—— *tenebricosa*, 407.
—— —— *arfaki*, 407, 408.
—— *tenebricosus*, 404, 407.
—— *walleri*, 398, 399.
subbuteo, Falco, 221, 223.
subcristata, Aviceda, 216.
subcristata, Baza, 212, 214, 216, 218.
——, —— *subcristata*, 216, 219.
——, *Pernis*, 216.
subcristatus, Lepidogenys, 216.
——, *Lophastur*, **216**, 214.
——, —— *subcristatus*, 220.
subleucosternus, Haliastur indus, 148, 156.
submelanogenys, Falco peregrinus, 241, 250.
——, *Rhynchodon*, 241.
——, —— *peregrinus*, 242, 251.
subniger, Falco, 253, 254, 256, 257, 258, 413, 422.
——, *Gennaia*, 253.
——, *Hierofalco*, 253.
——, *Notofalco*, **253**, 252, 421.
——, —— *subniger*, 253.
suboccidentalis, Hieracoglaux connivens, 337, 344, 345, 346.
——, *Ninox connivens*, 336, 344.
sumatrensis, Baza, 212.
sumbaënsis, Astur torquatus, 67.
——, *Tyto alba*, 371.
——, *Urospiza torquata*, 68.
superciliosa, Anas, 256.
Surnia, 362.
—— *fortis*, 335.
—— *strenua*, 356.
Swamp-Hawk, **24**.

Tachyspizias, 5.
Tachytriorchis, 8.
tadornoides, Casarca, 165.
tasmanica, Ieracidea berigora, 262, 276.
teesa, Butastur, **129**, 127, 130.
——, *Circus*, 129.
tenebricosa, Megastrix, **404**, 402, 407.
——, —— *tenebricosa*, 404, 408.
——, *Strix*, 407.
——, *Tyto tenebricosa*, 404, 405, 406.
tenebricosus, Strix, 404, 407.
Teraspiza, 73.
territori, Haliastur sphenurus, 161, 169.
testaceus, Astur, 87.
Thalassaëtus, 6, 7.
Thrasaëtus, 6, 7.
Tichornis, 4, 221; 281.
timorlaöensis, Baza subcristata, 219.
tinnunculoides, Falco, 285.
Tinnunculus, 4, 6, 7, 8, 221, 222, 223, 224, 281, 282.
—— *cenchroides*, 283.
tinnunculus, Cerchneis, 281.
——, *Falco*, 285.
Tolmaëtus, 116.
torquata, Urospiza torquata, 68.
torquatus, Accipiter, 76, 78, 83.
——, *Astur*, 63, 64, 65, 67, 71, 76.
——, —— *torquatus*, 66, 67.
——, *Falco*, 63, 78.
——, *Nisus*, 76.

INDEX.

tregellasi, Spiloglaux boobook, 311, 326.
——, —— *novæseelandiæ*, 329, 330.
Tribonyx, 412.
—— *ventralis*, 267.
Trichoglossus hæmatodus, 388.
—— *novæhollandiæ*, 245.
Triorches, 293.
tuidara, Tyto alba, 360, 371.
Turnix velox, 254.
Tyta, 363, 364.
Tyto, **360,** 361, 362, 363, 364, 386, 402, 403 (fig.)
—— *alba*, **365,** 360, 361, 366, 372, 386.
—— —— *affinis*, 371.
—— —— *alba*, 366, 371, 391.
—— —— *alexandræ*, 366.
—— —— *bargei*, 371.
—— —— *contempta*, 371.
—— —— *delicatula*, 365, 371, 391.
—— —— *deroepstorffi*, 371.
—— —— *detorta*, 371.
—— —— *ernesti*, 371.
—— —— *flammea*, 372.
—— —— *furcata*, 371, 391.
—— —— *glaucops*, 371.
—— —— *gracilirostris*, 371.
—— —— *guatemalæ*, 371.
—— —— *guttata*, 371.
—— —— *indica*, 391.
—— —— *insularis*, 371, 391.
—— —— *javanica*, 371.
—— —— *lifuensis*, 372.
—— —— *lulu*, 371.
—— —— *maculata*, 371.
—— —— *meeki*, 371.
—— —— *nigrescens*, 371.
—— —— *perlata*, 371.
—— —— *poensis*, 391.
—— —— *pratincola*, 371, 391.
—— —— *punctatissima*, 371, 391.
—— —— *rosenbergi*, 371.
—— —— *schmitzi*, 371.
—— —— *sororcula*, 371.
—— —— *sumbaensis*, 371.
—— —— *tuidara*, 360, 371.
—— *castanops*, 373, 388, 391, 392.
—— *cyclops*, 385, 391, 392.
—— *delicatula*, 365.
—— *flammea*, 372.
—— *galei*, 374.
—— *longimembris*, **398,** 360, 361.
—— —— *dombraini*, 374, 393, 401.
—— —— *georgiæ*, 398.
—— —— *longimembris*, 398.
—— —— *walleri*, 398, 400.
—— *melvillensis*, 373.
—— *novæhollandiæ*, **373,** 361, 372, 385, 386, 387, 388, 389, 391, 393, 401, 406.
—— —— *castanops*, 360, 374, 385, 391, 393, 394.
—— —— *galei*, 396.
Tyto novæhollandiæ kimberli, 374, 385, 386, 387, 388, 395, 396.
—— —— *mackayi*, 374, 385, 387, 388, 394, 396.
—— —— *melvillensis*, 374, 385, 389, 397.
—— —— *novæhollandiæ*, 374, 385, 387, 388, 393, 394.
—— —— *perplexa*, 374, 385, 386, 387, 388, 389, 393, 395.
—— —— *riordani*, 374, 375, 385, 388, 389, 393, 395.
—— —— *whitei*, 374, 385, 386, 387, 388, 394, 395, 396.
—— *tenebricosa arfaki*, 406.
—— —— *magna*, 404, 405, 406.
—— —— *multipunctata*, 404, 405, 406.
—— —— *tenebricosa*, 404, 405, 406.
—— *walleri*, 398.

Ulula, 360.
unicolor, Cerchneis, 283, 284, 289, 290, 291.
——, —— *cenchroides*, 284, 291.
Uraëtus, 94.
—— *audax*, 95.
Uraetus fucosa, 95.
Uraspiza 54.
—— *cirrhocephalus*, 77.
Uroaëtus, **94,** 6, 7, 9.
—— *audax*, **95,** 94, 103, 104, 105, 107, 111, 112, 135, 137, 143, 195, 413, 414, 415.
—— —— *audax*, 96.
—— —— *carteri*, 96.
—— *fucosa*, 95.
Urospiza, **54**, 55, 74, 75, 86.
—— *fasciata*, **56**, 54, 78, 89.
—— —— *cruenta*, 57, 62, 65‘ 68, 69, 70, 71.
—— —— *didima*, 57, 58, 62, 65, 68, 69, 70, 71, 72.
—— —— *fasciata*, 57, 65, 68, 69, 70.
—— —— *insularis*, 68, 72.
—— —— *maculosa*, 58.
—— —— *polycrypta*, 68, 72.
—— *torquata sumbaënsis*, 68.
—— —— *torquata*, 68.
—— —— *wallacii*, 68.
Urospizia, 54.
—— *approximans*, 57.
Urospizias, 6, 8, 54, 75, 84.
—— *approximans*, 57, 70.
—— *radiatus*, 87, 413, 414.
Urotriorchis, 5, 8, 16.
Urubitinga, 6.
Utolmaetus, 116.
—— *morphnoides*, 118.

Valeria, 127.
velox, Turnix, 254.
venatica, Ninox boobook, 328.
——, *Noctua*, 327.
——, —— *boobook*, 328.

venatica, *Spiloglaux novæseelandiæ*, 329.
ventralis, *Tribonyx*, 267.
verreauxi, *Aviceda*, 214.
——, *Baza*, 211.
victoriæ, *Berneyornis strenuus*, 357.
——, *Ninox strenua*, 356.
vulgaris, *Buteo*, 13.
——, *Milvus*, 13.
——, *Nisus*, 13.
Vultur, 1, 5, 8.
—— *audax*, 95, 97.
Vulture, Bold, 95.

wallacii, *Astur torquatus*, 67.
——, *Urospiza torquata*, 68.
walleri, *Strix*, 398, 399.
——, *Tyto*, 398.
——, —— *longimembris*, 398, 400.
Wedge-tailed Eagle (Eagle-Hawk), **95, 414.**
weiskei, *Eutolmaetus*, 123.
——, *Hieraaetus pennatus*, 123.
westraliensis, *Lophoictinia isura*, 183.
——, *Milvus isurus*, 182.
Whistling Eagle, **160, 417.**
White Goshawk, **43.**
—— Hawk, 45.
—— -bellied Eagle, 133, 134.
—— - —— Sea-Eagle, **133.**
—— -eyed Buzzard, **129.**
—— -faced Owl, 365.
—— -headed Osprey (Fish-Hawk), **295.**
—— - —— Rufous Eagle, 147.
—— - —— Sea-Eagle (Red-backed Sea-Eagle), **147.**
whitei, *Tyto novæhollandiæ*, 374, 385, 386, 387, 388, 394, 395, 396.
Winking Falcon, 335, 337.
—— Owl, **335.**
wolfi, *Circus*, 26, 32.
——, —— *approximans*, 32.
——, —— *gouldi*, 32.

Xerophila leucopsis, 256.

Zeraglaux, 334.

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